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Contents

Parts and Accessory Group Show Earnings Gain Over 1928 But Are Less Than 1929. By Norman G. Shidle	181
Diamond Neck Auto Bolt is Evolved From Scientific Study of Stresses. By Karl A. Eckhardt	183
Pratt & Whitney Production Line Has High Degree of Flexibility. By Joseph Geschelin	188
Just Among Ourselves	194
Lycoming Model UE Marine Engine Develops 165 Hp.	195
Hydrogenation Process Adopted for American Fuel Production	197
Standardized Trade Customs Adopted by Steel Foundries	199
Books for the Business Bookshelf	200
New Developments	202
Automotive Oddities	206
News of the Industry	207
Men of the Industry	208
Weekly Production Index	213
Calendar of Events	216
Advertisers' Index	96, 97

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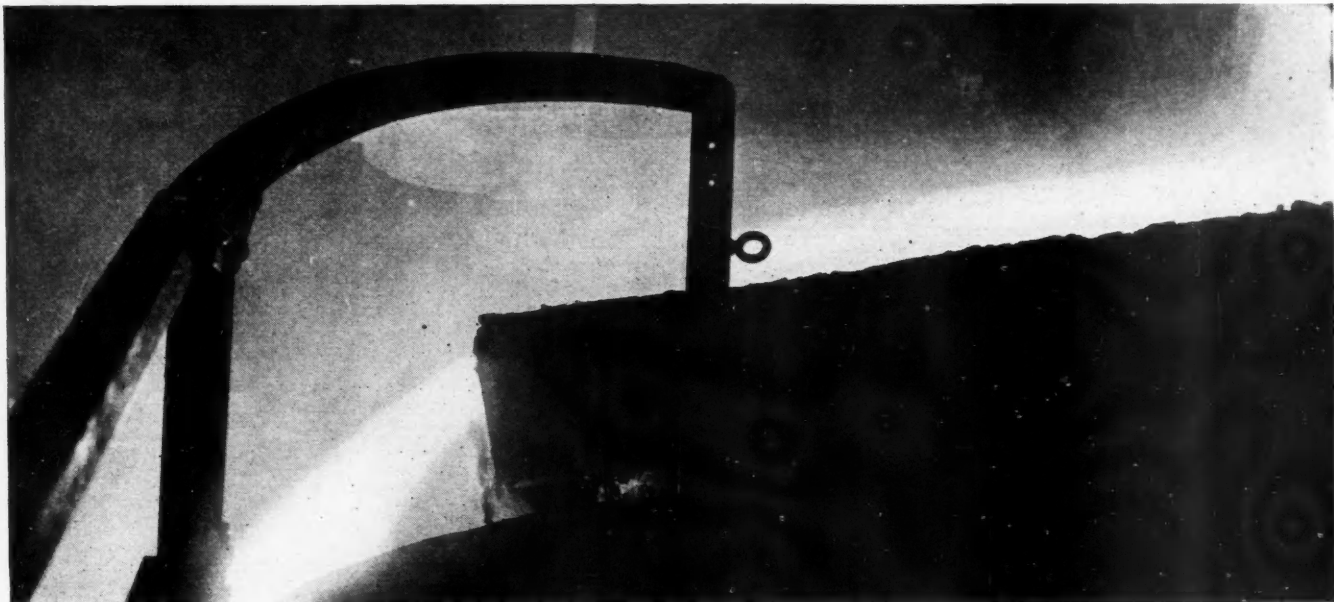
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Parts and Accessory Group Earns More Than in 1928, But Less Than in 1929

Industry's leaders have few losses during first six months of this year, despite generally depressed conditions

By Norman G. Shidle

FINANCIAL returns are coming in.

The factual answer is being written to the constant question of the last six months—"How's business?"

"Better than 1928 and not nearly as good as 1929" is the answer that is foreshadowed by early returns for that vast automotive parts and accessory field which has been so potent a factor in the development of our world's largest manufacturing industry.

Twelve typical automotive suppliers have already furnished profit figures for the first six months of 1930. Combination and study of the financial performance of this typical group point to the following conclusions:

First—Profits of automotive parts and accessory companies so far in 1930 have been about 10 per cent ahead of 1928.

Second—Profits of this group have been nearly one-third less than during the first half of 1929.

Third—Regular common stock dividend requirements for the year are certain to be met in a large majority of cases.

Fourth—Very few important companies have actually shown a net loss, despite the generally depressed conditions under which the industry has operated since last fall.



"Better than 1928 and not nearly as good as 1929," early returns for 1930 from parts and accessory makers indicate + + + + +

Individual variations from the general trend, of course, are numerous, but there is every reason to accept the early returns as reasonably accurate indicators of the condition of the established parts and accessory organizations of the industry. Companies whose statements have been included specifically in the present analysis comprise: Motor Wheel Corp., Bohn Aluminum & Brass Corp., Timken Roller Bearing Co., Detroit Steel Products, Ross Gear & Tool Co., Briggs Manufacturing Co., Budd Wheel Co., Eaton Axle & Spring Co., L. A. Young Spring & Wire Corp., Murray Corp., Spicer Manufacturing Co. and Kelsey-Hayes Wheel Co.

Generalization from specific instances always is dangerous business, but it seems fair to accept this dozen financial statements as the basis for some discussion of trends in the automotive parts and accessory field in the immediate future.

Certainly the relatively good showing made by representative companies points to a striking injection of efficiency and management ingenuity in meeting the

Suppliers' Earnings Decline from 1929 Level

Company	Div. Rate Per Year	Earnings Per Share of Common Stock, First Half 1930	Net Earnings First Half 1929	Net Earnings First Half 1930	Approximate Per Cent Loss or Gain—1930 of 1929
Motor Wheel Corp.	\$2	\$1.15	\$2,432,998	\$980,607	-60
Bohn Aluminum & Brass Corp.	3	1.95	1,781,579	688,766	-61
Timken Roller Bearing	3	2.54	8,449,198	6,120,023	-28
Detroit Steel Products	2	-.73	151,010	145,828	-196
Ross Gear & Tool Co.	3	1.61	436,336	256,948	-41
Briggs Mfg. Co.	None	..	2,422,697	3,531,803	+46
Budd Wheel Co.	1	.90	1,216,695	925,132	-24
Eaton Axle & Spring Co.	3	2.18	2,059,753	1,385,630	-33
Young Spring & Wire Co.	3	2.62	1,524,325	1,080,654	-29
Murray Corporation	2% stock	.95	1,632,676	734,043	-55
Spicer Mfg. Co.	None	..	1,552,824	417,943	-73
Kelsey-Hayes Wheel Co.	2	2.24	1,975,779	1,803,228	-8.7
Total			\$25,635,860	\$17,779,777	-30.6

With the worst of the depression unquestionably behind, the automotive parts and accessory industry has demonstrated its essential stability and soundness + + + + +

economic hardships which swooped down last fall and have been parking with the persistence of self-invited relatives ever since.

Parts prices, for example, are considerably lower, whether sold for original equipment or for replacement, than they were in 1928. Merchandising effort necessary to move a given quantity of merchandise unquestionably is *greater* than two years ago.

And, while accurate figures are not available, the 1930 volume of parts makers in a number of instances has without doubt been no larger than it was in the first six months of 1928.

Considering all these factors, then, it becomes evident that the work of cost reduction within the factory and marketing organizations of the average automotive supply organization has been vigorously and successfully pursued without interruption.

Compared with the first half of 1929, of course, the financial returns of the last six months have been disappointing. Of the twelve prominent companies listed in the accompanying table only one—Briggs Manufacturing Company—shows a greater net for the first half of 1930 than for the same period in 1929. Only one of the group, on the other hand, has actually gone into red figures for the first half and it showed a profit in the second quarter.

Compared with 1928, however, six companies in the group show increased earnings this year. And the six which do not show increases over 1928 have gains more than large enough to offset the losses as compared with 1928 made by the other six organizations listed. Those which show gains over 1928 are Kelsey-Hayes, Briggs, Budd Wheel, Eaton Axle & Spring, Young Spring & Wire and Murray, while Timken Roller Bearing came within a very few per cent of equaling its 1928 first half year earnings.

With the worst of the business depression unquestionably behind, the automotive parts and accessory

industry as a whole has demonstrated in superb fashion its essential stability and soundness. In addition to showing quite reasonable earnings in many instances during the depression period, a large number of these companies carried forward engineering and technical development work at a more rapid pace than ever before.

At a time when many industries have been giving tremendous hostages to the future by reducing all development activity to a minimum, automotive parts companies, on the average, have stuck courageously to their researches and to their engineering progress work—in some instances more intensively even than have the vehicle manufacturing companies themselves.

Having weathered the storm, then, without laying up for the future heavy development loads due to atrophied experimental programs, there is every reason for a majority of firms in the supply end of our industry to look forward to the last half of 1930 and the first half of 1931 with confidence.

Marketing and advertising programs are due for intensification and expansion in many instances as fall opens up a new industrial selling season and the results of these efforts by progressive firms will almost certainly result in putting the last half of 1930 in a more favorable relation to 1929 from a net profit standpoint than was the case during the first half.

Replacement business, while somewhat behind 1929, has not suffered nearly so much as has original equipment business and has, in more instances than one, been the cornerstone upon which vendor parts makers have been able to build at least a respectable profit structure this year. Thus they have not only profited

(Turn to page 193, please)

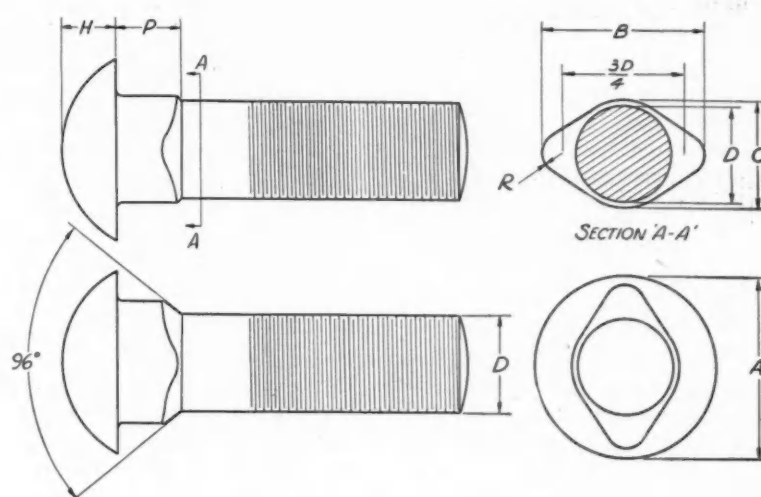


Fig. 1—The diamond neck auto bolt which is designed to replace carriage type in the automotive industry

Diamond Neck Auto Bolt is Evolved from Scientific Study of Stresses

Principal object in development was to facilitate production and eliminate common defects

Analytical comparison made with carriage type

By Karl A. Eckhardt
The Lamson & Sessions Co.

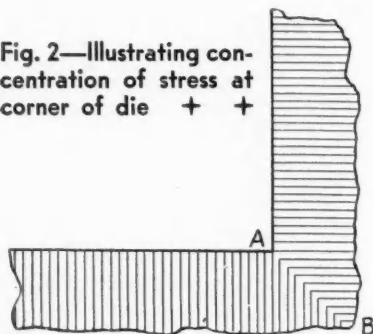
THE most commonplace phenomena, when studied at close range, often become objects of surprising interest. This is true of the products of the bolt and nut industry. They are with us from the cradle to the grave, and thus they become so familiar that very few of us give them more than passing attention. Yet there is so much to be considered in the design and the manufacture of even the simplest of them, that they often become the subjects of extensive research.

The carriage bolt is evidently the outgrowth of the wagon blacksmith's art. The requirement of that day was merely a bolt with a smooth oval head and—since it lacked a screw-driver slot—some method of preventing rotation while it was being tightened. In museums we find some of these bolts whose square shoulder extends almost to the end, allowing only a very short thread. Others have the appearance of having the threads cut directly on the square stock without even swedging. These examples indicate that such bolts were forged, usually by hand, from square stock.

When automatic bolt machinery began to take the blacksmith's place this long shoulder disappeared. It was impractical to make and quite unnecessary. A short, square shoulder prevented rotation, and it was easier to make. With the advent of bolt machinery using round material, the problem was no longer how to swedge the shaft of the bolt, but how to produce a satisfactory square shoulder.

There was no serious attempt at standardization until about 1920, when the American Standard Association began to study the problem. But a study of the dimensions, standardized by this committee, shows that, like Topsy, this bolt just grew. It is true that the recommendations were in line with the policies of the greatest number of manufacturers and users. This is as it should be, and the author has no fault to find with the work of the committee on standards. Simple calculations, however, show

Fig. 2—Illustrating concentration of stress at corner of die + +



that the head of the present carriage bolt is almost $2\frac{3}{4}$ times as high as is actually required to prevent it from shearing through under tension. It is easy to realize this when we consider the thickness of the heads of the step bolt and the fin

neck bolt, two other members of the round unslotted-head group. These heads are extremely thin when compared with that of the carriage bolt, yet we never hear of any of them shearing through when in use.

There has been long a need for a distinctive bolt that would satisfactorily take the same place in the automobile world that was occupied by the carriage bolt in former days. With this in mind, the engineers of the Lamson & Sessions Co. of Cleveland, Ohio, have developed a bolt intended primarily for the automotive industry, but applicable also in many other fields. The credit for the development of the auto bolt should properly go to W. M. Horton, of the Lamson & Sessions Co., and chairman of Subcommittee No. 5 of the American Standards Association, as it was under his direction and with his cooperation that the new auto bolt was produced.

The auto bolt, Fig. 1, is a round unslotted-head bolt, with the head proportioned according to existing standards of the American Standards Association, on the sizes of carriage bolt heads. The adoption of these sizes was due to a consideration of the fact that any change here would require a huge expenditure for new tools, while the retention of these sizes makes it possible for the manufacturer to use for this bolt the same tools which are used for forming the heads of many of the other bolts of the series of round unslotted-head bolts. The essential difference between this bolt and the carriage type lies in the shape of the cross-section of the shoulder. This is in the form of a diamond—hence the name—with rounded corners. It may be said, perhaps, to more closely resemble an ellipse, as shown by the dotted lines in Fig. 5. The arcs of the minor diameter (which is slightly larger than the diameter of the body of the bolt) are connected to those at the ends of the major diameter by straight lines. The reasons for the selection of this particular shape may be found in the history of the development of the bolt.

The track bolt, used in splice bars of railroad tracks, has long been known. It is seldom, if ever, that the oval shoulder of this bolt turns in the elongated hole, which is punched in the splice bars, and hence this feature seemed to recommend itself. However, the general appearance of the bolt also had to be considered and experiments were conducted to produce a bolt that would combine good looks with utility, at the same time keeping in mind a

product that would be equal to or better than the carriage bolt in its physical characteristics.

Of course, some form of the square shoulder might have been retained. But the viewpoint of the manufacturer had to be considered. The square shape of the carriage bolt, even under the best of conditions, has always been a source of more or less grief. This trouble manifests itself not only in the finished bolt, where difficulty is encountered in maintaining sharp corners, but also in the making of the tools.

Without the introduction of the extra operation of reheating it is almost impossible to maintain a sharp corner on the square of the carriage bolt shoulder. The raw material from which these bolts are made usually becomes coated with dust, dirt and other foreign material. In the upsetting process this foreign material lodges in the sharp corners of the forming tools, and under the influence of the repeated hammering and the compressive action of that process, it becomes so hard that it effectively prevents the metal from flowing into these corners. The result is a poorly formed shoulder, and, of course, rejections attending these. Fig. 4 shows clearly the result. This bolt was taken from tools that had been in operation only two hours.

The auto bolt shoulder without the sharp corners has eliminated this difficulty. This shape provides no place for the accumulation of foreign matter, and thus it does away with the poorly formed shoulder. Hence, from start to finish throughout the life of the tools, the auto bolt should benefit the bolt manufacturer from this point of view alone.

A bolt like that shown in Fig. 4 requires that the tools be removed from the machine, cleaned out and replaced. This operation takes from 15 to 30 minutes, and as it occurs frequently, one can see that considerable time is lost in the course of a day's work. So, then, we may add to the improved

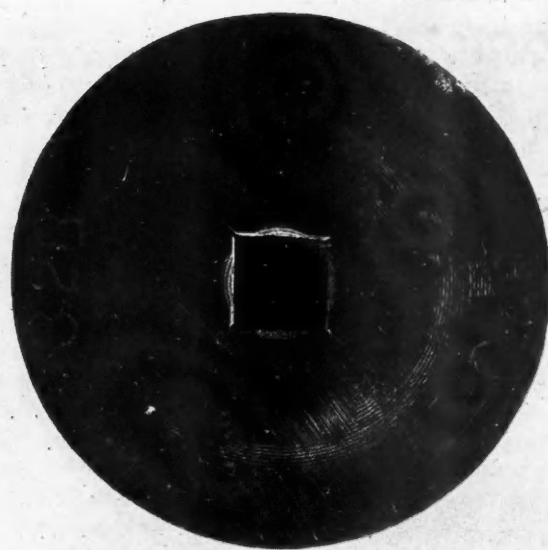


Fig. 3—Showing die damaged by cracks at corners of square

product the saving in time required for producing that better class of work.

But this is not all. As some of the readers may not be familiar with the tools used in making a bolt by the upsetting process, let us explain briefly. A set of upsetting tools for a bolt of this type—that is, one with a shoulder—consists of a die in which are formed the body and the shoulder, and a punch or hammer containing the shape of the head.

Now, anyone even slightly familiar with the process of hardening and tempering steels knows that difficulty is often encountered in hardening objects with sharp inside corners. This is due to the fact that the crystals of which the metal is composed tend to arrange themselves in lines perpendicular to the surface, as in Fig. 2, while cooling. On account of this tendency, it often happens that severe strains are set up along the line AB, and sometimes cracks start at these places. The author has often observed dies that were actually split apart by such internal strains.

It would be expected, then, that this weakening would be present to some extent even in the finished dies. The failures in service of dies for making carriage bolts show this to be true. Even before the die wears out, or becomes too large, or out of shape, cracks begin to appear, always starting at the corners and radiating toward the outer edges of the die. This is well shown in Fig. 3. In addition to cracks, each corner of the square shows a small piece broken away from the body of the die. This almost invariably happens when the crack first appears, and the die must then be rejected, for such imperfections appear on the finished bolt.

In production such tools are made by driving a broach, shaped to conform to the shoulder, into the die. But the proposed shoulder makes it possible to make the dies in small quantities by drilling three holes and shaping out the intervening metal along the straight lines forming the tangents.

The foregoing discussion brings out the advantages of this design to the bolt manufacturer; the auto bolt, however, should appeal to the user as well as to the manufacturer.

In the automotive industry many of

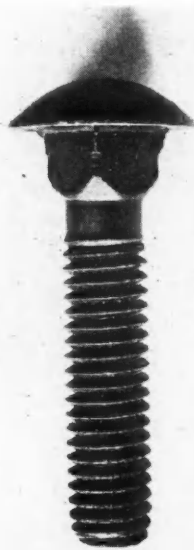


Fig. 4—Imperfect corners are produced on a carriage bolt when accumulations of foreign materials lodge in the corners of the die + + + +

these bolts will ultimately be inserted through a hole punched through a piece of metal. One of the most common applications in this work would be in the hubs of the wheels. Now, most readers will at once see the advantage of such a shape as that proposed for the shoulder of the new bolt. The square shape again produces a noticeable weakness, and under the influence of vibration and shock, cracks are started and the hub plate breaks under the strain. While only one example is given, this bolt has many applications.

Likewise, it has been estimated that the shape of the auto bolt shoulder is such that it will require only about one-fifth as many punches for such holes. The rounded punch has about five times the life of the punch with sharp corners.

These considerations resulted in a bolt proportioned according to the formulae given below and illustrated in Figs. 1 and 5.

Table I—Proportions of Auto Bolt

Item	Symbol	Value
Diameter of Head	A	$2D + 1/16''$
Height of Head	H	$\frac{D}{2}$
Depth of Shoulder	P	$\frac{D}{2} + 3/32''$
Width of Shoulder	B	$\frac{5D}{4}$
Thickness of Shoulder	C	$D + .020''$
Focal Center Distance	F	$\frac{3D}{4}$
Focal Radii	R	$\frac{D}{4}$
(D = Diameter)		

Originally the thickness of the shoulder was equal to the diameter of the bolt, but in response to several requests it was changed to the proportion given, which makes it possible to use the bolt in places where it is to be inserted through a hole punched in metal without damaging the thread. This always caused more or less trouble with carriage bolts in which the side of the square was equal to the outside diameter of the thread.

In order to determine the several characteristics, it is first necessary to find the perimeter and the cross-sectional area. Rather than resort to the polar planimeter, we have divided the cross-section as shown in Fig. 5, and then worked out the perimeter and the area as shown below.

Analysis for Perimeter

Since the figure is symmetrical about both axes, it is evident that the perimeter is equal to four times the sum of arc LM, tangent MN and arc NP. We may then establish the following relations.

Since *a* is perpendicular to OM at T by construction, and OM and SN are both perpendicular to MN, being radii at points of tangency, *a* is parallel to MN and *s* and *f* are parallel. Hence, MNST is a rectangle and MN = *a*. Now, angle OTS is a right angle, hence

sizes there is less volume in the shoulder of the auto bolt than in that of the carriage bolt. Now, since the tendency of the automotive industry always has been toward lightness combined with strength, this feature should recommend the auto bolt. The ratios given, of course, apply only to the amounts of material in the shoulder, and the idea should not be formed that the auto bolt is startlingly lighter.

Forces Required to Seat Bolts

In use this type of bolt is inserted in a hole previously drilled to receive it. The nut is then pulled down tight with a wrench, thus drawing the shoulder into the material. Hence, a factor that influenced the design of the auto bolt was the force required for this work.

This action is somewhat similar to that of a punch in a punch press. Then, in order to compare the forces required it is only necessary to find the ratio of the shear area of the auto-bolt shoulder

Table III—Comparison of Forces Required to Drive to Full Depth of Shoulder in White Oak

Diameter	Average Load 25 Determinations		Ratio Carriage Auto Bolt
	Auto Bolt	Carriage	
3/16	101	115	1.138
5/16	248	285	1.148
3/8	375	434	1.157
7/16	479	538	1.125
1/2	848	975	1.149

Theoretical Ratio = 1.1131 to 1.159

with respect to that of the carriage bolt.

In the former, this is the lateral area of a solid with a modified elliptical base, while the shear area of the carriage bolt shoulder is the lateral area of a square prism where the side of the square is equal to the diameter of the bolt.

Now, the shear area of the auto-bolt shoulder is

equal to the product of its perimeter into its depth, that is,

$$(0.3566 + 3.404 D + 0.009 D^2) (D/2 + 3/32)$$

while that of the carriage-bolt shoulder is

$$4 D (D/2 + 3/32)$$

hence the ratio of shear areas (carriage bolt/auto bolt) is

$$4 D / (0.03566 + 3.404 D + 0.009 D^2)$$

If we calculate the values of this ratio for the bolts in the table we find that they vary from 1.1131 for the 0.190-in. to 1.1590 for the 1-in. bolt, so that it requires from 1.1131 to 1.1590 times as much force to drive the carriage bolt into the material as it does to drive the corresponding size auto bolt home.

Table III gives the results of some tests made to determine the accuracy of this formula. It shows results varying from 1.125 to 1.157, which are well within the range established above.

These tests were made on an Olsen 50,000-lb tensile testing machine. The bolts were driven to within 0.002 in.—as determined by a thickness gage—from the bottom surface of the head, through a previously drilled hole just equal to the major diameter of the thread. The material used in making these tests was a piece of good quality, clear white oak. The results given are the averages of twenty-five determinations in each case.

Resistance to Torsion

The primary function of the carriage-bolt shoulder is to prevent rotation. Since the auto bolt has been designed as an improvement on this type, this feature should be considered. To this end some tests were conducted, with the apparatus illustrated in Fig. 6, and the results obtained are summarized in Table IV.

Two nuts were pulled up tight on the bolts and drawn down just far enough so that there would be no longitudinal motion, but not far enough to create
(Continued on page 193)

Specifications of Auto Bolts—Diamond Neck Type

Nom. Size	D Major Diam. of Thread		Thds. Per Inch	A Diam. of Head		H Height of Head		P Depth of Shoulder		C Thickness of Shoulder		B Width of Shoulder		R Radius of Shoulder	
	Max. Basis	Tol. —		Basic	Tol. + or —	Basic	Tol. + or —	Min. Basic	Tol. +	Min. Basic	Tol. +	Min. Basic	Tol. +	Min. Basic	Tol. +
No. 10	.190	.009	24	.438	.010	.094	.010	.188	.031	.210	.005	.238	.010	.047	.010
1/4	.250	.010	20	.563	.010	.125	.010	.219	.031	.270	.005	.328	.010	.063	.010
5/16	.3125	.013	18	.688	.010	.156	.010	.250	.031	.333	.005	.391	.010	.078	.010
3/8	.375	.015	16	.813	.010	.188	.010	.281	.031	.395	.005	.468	.010	.094	.010
7/16	.4375	.015	14	.938	.010	.219	.010	.313	.031	.458	.005	.546	.010	.109	.010
1/2	.500	.015	13	1.063	.010	.250	.010	.344	.031	.520	.005	.625	.010	.125	.010
9/16	.5625	.016	12	1.188	.015	.281	.015	.375	.031	.583	.006	.703	.015	.141	.015
5/8	.625	.017	11	1.313	.015	.313	.015	.406	.031	.645	.006	.781	.015	.156	.015
3/4	.750	.020	10	1.563	.015	.375	.015	.469	.031	.770	.006	.938	.015	.188	.015

All dimensions in inches. Radius of fillet between body and head 1/32 in. on sizes Nos. 10 to 1/2 in., inclusive; 1/16 in. on 5/16, 3/8 and 1/2 in.

All screw threads are to be American standard, coarse thread series, free fit (Class 2), with special major diameter tolerances provided for unfinished hot rolled material (Table 8, "American Standard Screw Threads").

The threads on these bolts shall be produced by cutting or rolling. When rolled, the shank diameter will necessarily be smaller than the corresponding cut threads.

Pratt & Whitney Production Line

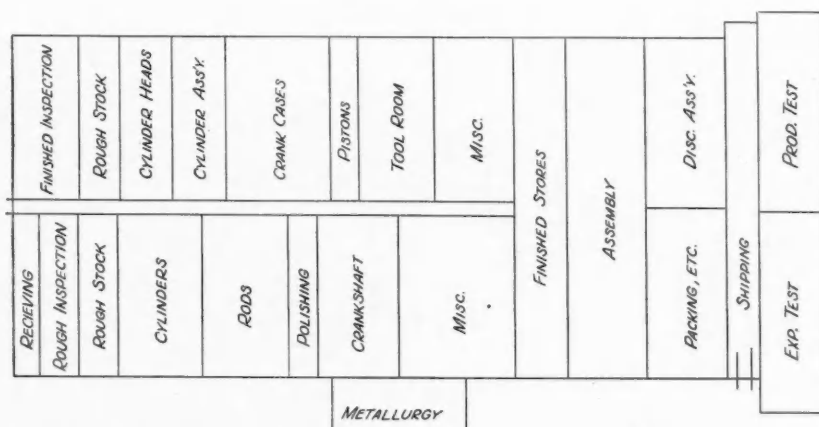


Fig. 1 — Diagrammatic floor plan arrangement of the Pratt & Whitney aircraft factory + + + +

FROM the standpoint of modernity in design, equipment and planning, the new home of Wasp and Hornet engines is one of the finest in the country. Located in East Hartford, Conn., the Pratt & Whitney aircraft factory covers an area of 500,000 sq. ft. with departments laid out bisymmetrically, as shown in the floor plan. Sky-lighting, painting and structural details are skillfully related so as to provide a flood of light in every corner of the plant.

The arrangement of the floor plan (Fig. 1) was conceived with a definite objective. At the extreme left is the storage and receiving inspection for all incoming, raw and finished materials. Manufacturing departments are arranged bisymmetrically about the long central aisle so that aluminum is machined on one side of the center aisle, while steel is processed on the other, raw stock at the extreme left being segregated in the same manner. Machining operations start at the outer ends of each department, at the walls, and move toward the center aisle, where finished parts in both aluminum and steel meet and are trucked to the assembly departments.

Floor space is so plentiful due to the excess capacity for expansion that a high degree of flexibility has been achieved in planning the operations in each department. For example, a separate line of similar machines has been provided for each different type of engine so as to distinguish

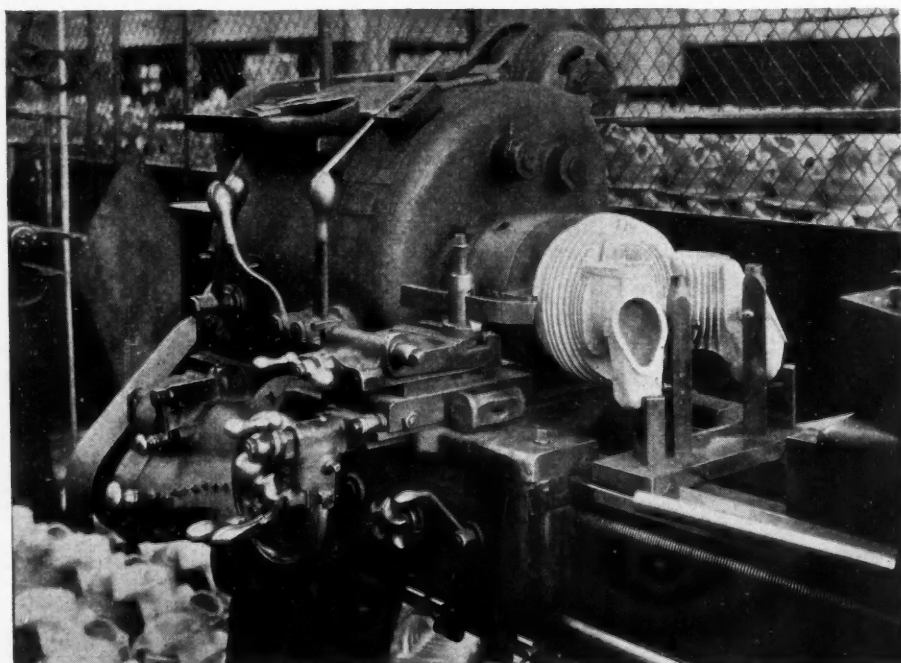


Fig. 2 — Initial aligning operation on cylinder head casting. This supplies the locating points for all subsequent machining operations

Has High Degree of Flexibility

By Joseph Geschelin

between high and low production requirements. Because output is low, as compared with the production in automobile plants, they have designedly avoided the introduction of special or high-production machine tools by subdividing operations and spreading them over a number of simpler machines or simpler set-ups. In their particular case this makes for flexibility and actually reduces equipment investment.

Following current practice in aircraft engine design, cylinder heads are of aluminum, while cylinder barrels are completely machined from alloy steel forgings. Bronze valve seats and valve guides are shrunk in the heads and the head itself is shrunk on the cylinder barrel. An interesting thing about the cylinder head is that the internal thread, into which the cylinder barrel screws, is cut entirely by hand. This is a final operation, hand-tapped in a fixture operated by two men, the object being to preclude any possibility of spoilage or inaccuracy that might cause rejection of the cylinder head at the final operation. The assembled cylinder head and barrel are subjected to a water test of 500 lb. per sq. in., before this unit continues to the assembly operations.

At the extreme right, which is the rear of the plant, are located a series of inclosed dynamometer rooms in which every engine is production-tested. After a rigid test of 10 hours, the engine is completely disassembled, each part individually inspected, then reassembled complete and tested again for 3 hours. This disassembly and inspection department is provided



Fig. 3—Close-up view of tooling on Potter & Johnston turret lathe for boring and turning operations on the aluminum cylinder head + + + + +

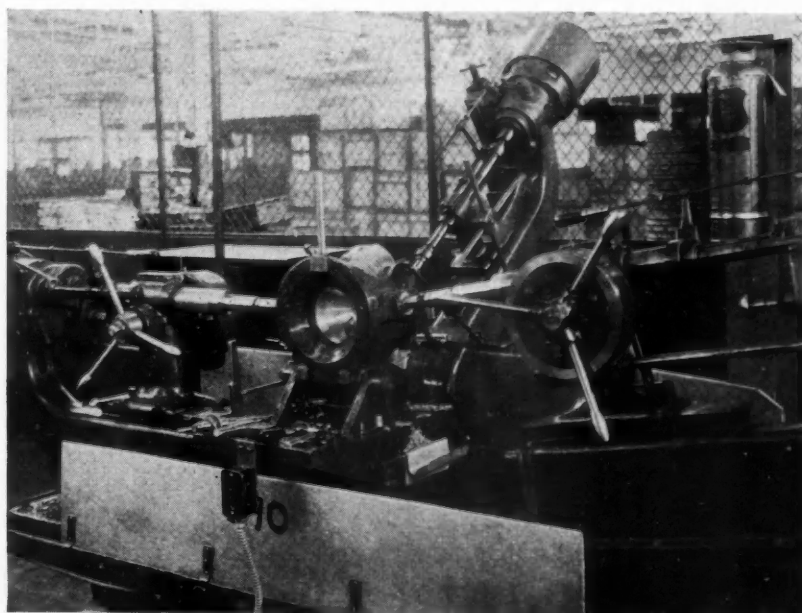


Fig. 4—Three-head Leland-Gifford drill for cylinder head operation + + +

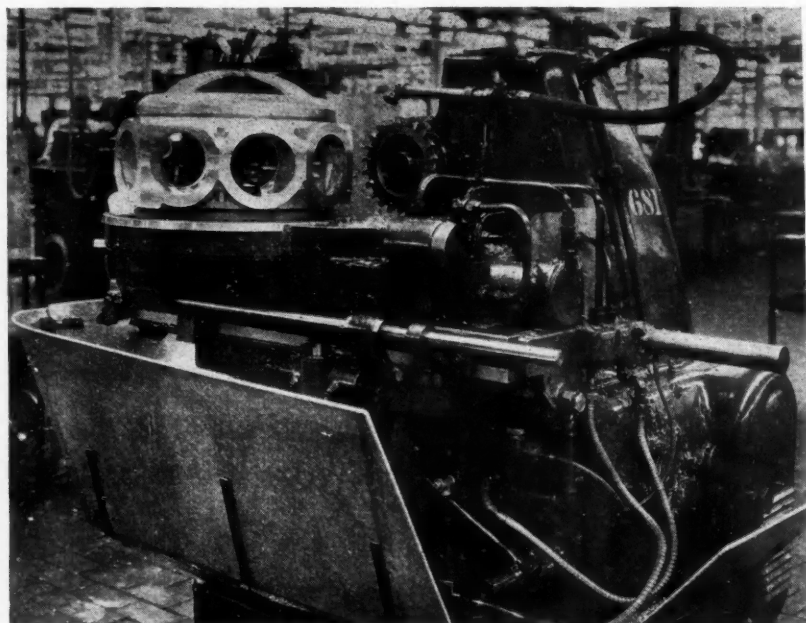


Fig. 5 — Sundstrand-Rigidmil set-up for milling nine-cylinder pads on the main crankcase + + +

with metal-top benches, each with sufficient area to accommodate all the parts from a single engine.

Probably the best evidence of the progressiveness of their manufacturing organization lies in the constant seeking for new methods to improve quality and production processes. Among other things, the writer was impressed with the work they are doing in experimenting with a process of lapping cylinder barrels on a standard internal grinder using a cork wheel. The process seems to hold a good deal of promise, the final outcome being dependent upon the selection of the right grade of cork wheel. We also noted several ingenious adaptations of cemented tungsten-carbide in some experimental tooling which may develop important principles when the final form of the tool is determined.

Perhaps the best answer to the problem of aircraft

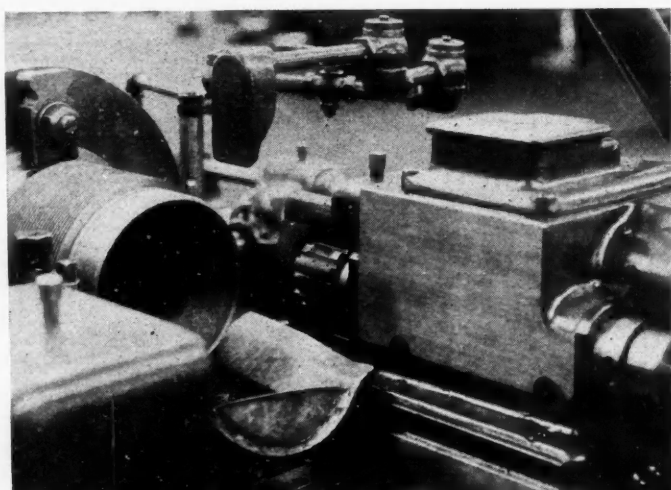


Fig. 7a—Cylinder heads are heated in Gehrich ovens to 550 deg. Fahr.

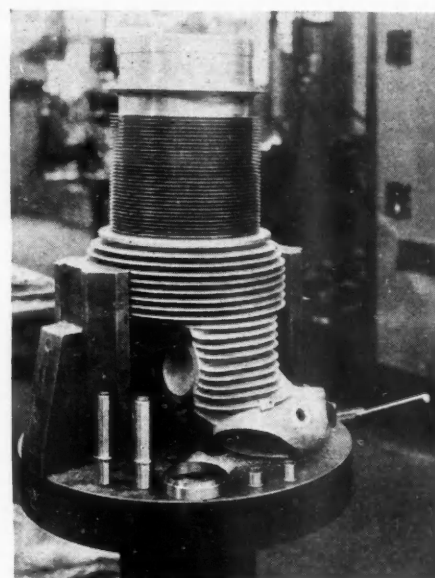


Fig. 7—Fixture on which cylinder head and barrel are assembled. Note bronze inserts + + + + +

Fig. 6 — Single operation set-up for turning, facing and threading the end of cylinder barrel on Hanson-Whitney Threadmiller + + + + +

inspection is found here. According to the plant superintendent, operations are tooled so as to produce tolerances closer than those specified on the working drawing, thus providing a margin of safety which cuts rejections down to a minimum. As an adjunct to this each operator checks his work carefully before it leaves his hands so that his work is of guaranteed accuracy before it reaches the inspector. Although the primary cost per operation might conceivably be higher, overall costs must be a good deal better by this method when the savings due to the elimination of rejection are considered.

Since space does not permit more than a discussion of the high spots, we have selected for the purpose of illustration a number of interesting operations taken at random throughout the plant. Consider the cylinder head, which requires 18 operations as given in detail below:

1. Rough inspection — Inspect for cracks, blow holes, stamp lot no.
2. P. & W. Lathe—Check position, bore, turn.
3. P. & J. Mach.—R. face, R. bore, F. bore, F. face, F. Turn.
4. Spec. Tapping Fix.—Tap 5.5465-.001 x 12 P.
5. Water Test—500 lb.
6. 1 Spdl. Barnes—Face off core & rough bore, ream.
7. Barnes—Spot face & c'bore inlet & exh. valve guide holes.
8. Hand Mill—Mill (2) rocker box flanges to 1 9/32 in.
9. L&G Spec.—Drill, R. ream, F. ream, spot face & C'bore.
10. Hand Mill—Mill intake & exh. flange 2 in. to center.
11. Spec. 3 Spdl. L&G—Drill & C'bore, back face, hand tap.
12. L&G Spec. 2 Spdl.—Drill & C'bore push rod holes.
13. L&G Drill—Drill (4) holes and tap (2) holes.
14. 3 Spdl. Drill L&G—Drill inlet & exh. flanges, tap.
15. L&G Drill Press—Counterbore overall 2 1/4 dim.
16. Bench—remove sharp edges & burrs, scrape ports & rocker box.
17. Avery—Bore (2) 2 in. dia. holes 3/8 in. deep.
18. Inspection—Inspe. Gov. stamps for test.

As a foundation for all the machining operations on the cylinder head, an ingenious initial operation shown in Fig. 2 has been developed. The rough casting is mounted in a specially rigged Pratt & Whitney engine lathe and accurately chucked after aligning the ex-

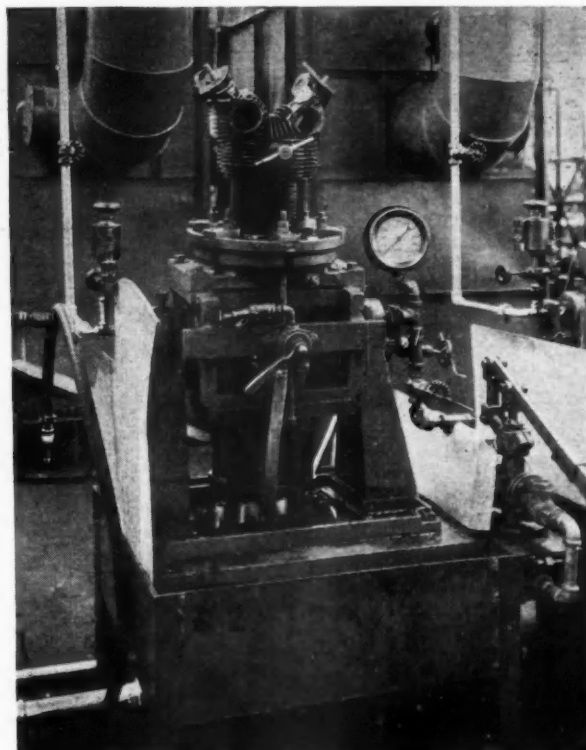


Fig. 8—Water-testing cylinder barrel and head sub-assembly

treme ends by means of the simple fixture shown at the right. After the piece has been trued and chucked, the operator turns the outside diameter at the left near the chuck and drills and reams the centralizing hole in a special boss at the right which is cast on the fins and eventually cut off.

Operation No. 3 on the Potter & Johnston turret lathe is accomplished by means of the tooling shown in Fig. 3. A mighty fine set-up for Operation 13 is shown in Fig. 4. This is a special Leland-Gifford three-head

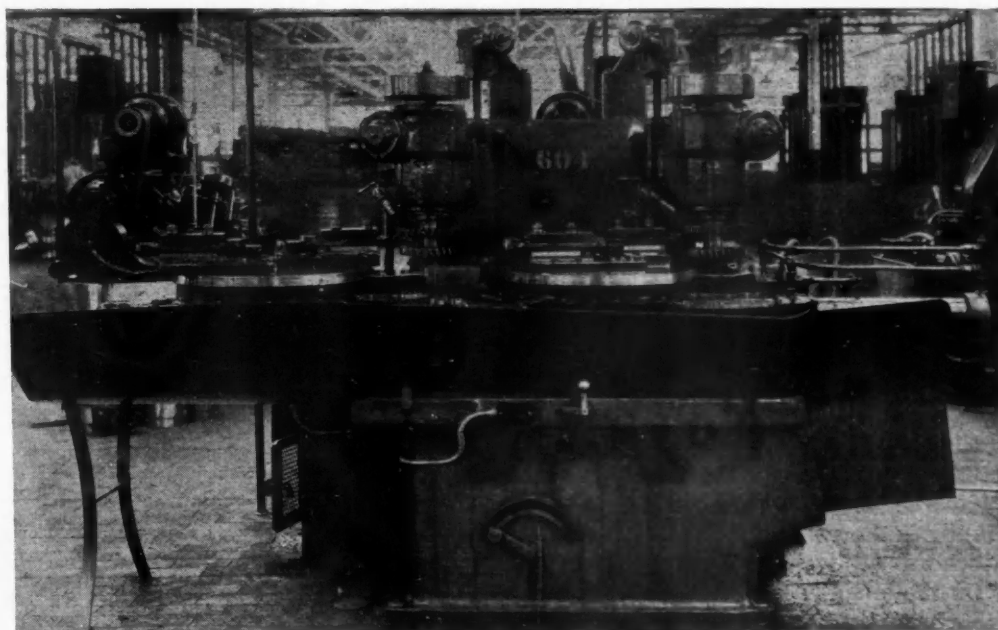
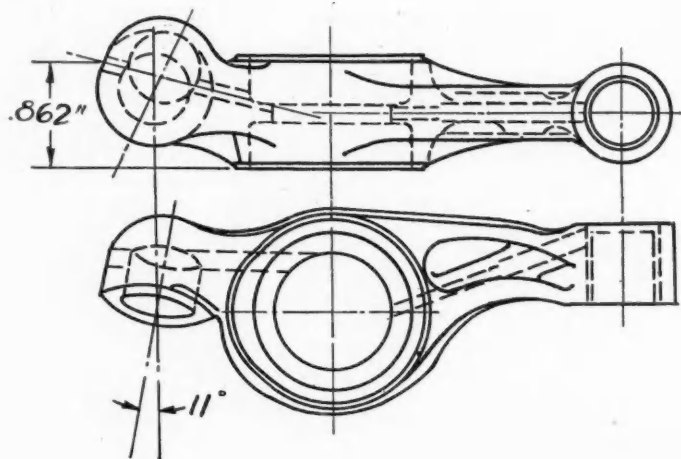


Fig. 9—Double head Sundstrand with hydraulic feed and indexing rotary fixtures for straddle-milling ends of articulated rods



Detail of rocker arm showing location of holes drilled on Kingsbury machine

Fig. 10 (below) — Five-head Kingsbury drilling machine set-up for completely drilling and facing valve rocker arms

drill press with two horizontal heads arranged for drilling, spot-facing and tapping spark plug holes, while the back spindle drills and taps the primer holes.

Another example of the principle of subdivision of operations is given in the following summary sheet for the crankcase front section. Note the three separate set-ups, Operations 3, 4 and 5 on the 24-in. Bullard machine.

1. Rough Inspection—Check.
2. Surface plate—Layout on surface plate.
3. 24 in. Bullard—Rough face.
4. 24 in. Bullard—Face, R&F in. turn, R&F in. bolting, Fl. turn, chamfer.
5. 24 in. Bullard—R&F in. face, R&F in. bore, chamfer, face.
6. Barnes Drill—Drill (17) 13/32 holes.
7. L&G Drill—Drill (3) 11/32 holes.
8. 24 in. Cin. Mill—Mill oil sump con. pad.
9. Backspot Facing Machine—Backspot face.
10. Drill, counter-bore, tap.
11. Barnes Drill—Drill, face bore, counter-bore, drill, tap.
12. Drill spot face, ream.
13. L&G Drill—Drill (2) No. 6 holes.
14. L&G Special Drill—Machine tap.
15. L&G Drill—Machine tap.
16. Bench Tapping Stand—Finish hand tap.
17. L&G Drill—Drill (2) 17.64 holes.
18. Bench & Electric Drill—Drill.

Finish milling of the cylinder faces on the main crankcase section is accomplished on a Sundstrand Rigidmil, shown in Fig. 5. This machine has a hydraulic feed mechanism and an indexing rotary fixture which automatically indexes the nine cylinder pads.

On the other side of the aisle in the cylinder barrel department are found a number of other unusual oper-

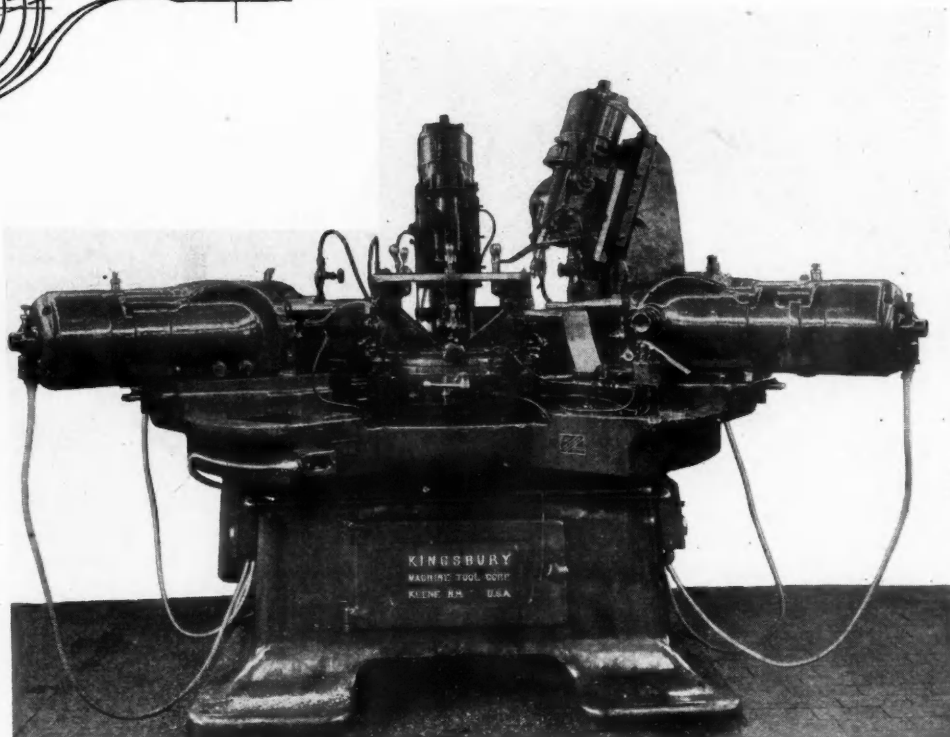
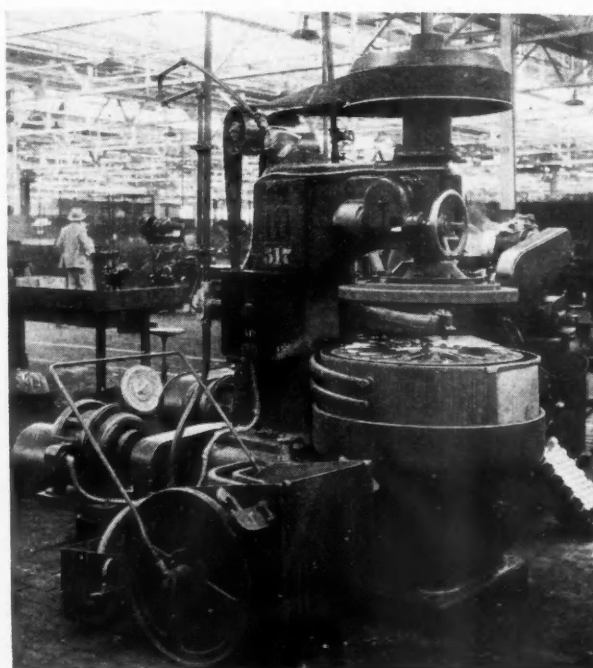


Fig. 11 (below)—Norton abrasive type lapping machine with fixture holding 16 piston pins



ations. For example, in Fig. 6 is shown a set-up on a Hanson-Whitney thread miller with a special hob which turns the outside surface, cuts the thread, turns the smaller diameter at the extreme end and faces the end in one continuous operation. The final thread is perfectly formed and possesses a beautiful finish.

Finished cylinder barrels and cylinder heads meet at the center aisle, whence they are carried to the sub-assembly department. Here the cylinder head is heated in a Gehrich baking oven to 550 deg. Fahr. After soaking for 90 min. the head is placed in the fixture, Fig. 7, the inserts pushed in by hand, and the cylinder barrel screwed in by hand. Then, after cooling, the subassembly is water-tested at a pressure of 500 lb. per sq. in. in the special fixture, Fig. 8.

Large and small ends of articulated rods are milled semi-automatically on the specially designed, double-head Sunstrand milling machine, Fig. 9. Hydraulic feed and two rotary indexing fixtures are employed, each fixture accommodating two rods so that unloading and loading take place while the machine is in action. The fixture at the left straddle-mills the small end, while the one at the right straddle-mills the larger end. The thickness of the ends in this operation is held to a tolerance of 0.002 in.

Some idea of the range of usefulness of the modern multiple-head drilling machine may be visualized from the set-up in Fig. 10, designed for the rocker arm shown in detail at the side. This specially built Kingsbury drills, spot-faces and taps the adjusting screw

holes, drills the two oil holes leading from the ball-bearing bore and the top hole. Indeed, a remarkable development in semi-automatic operation.

Following a practice which seems to be rapidly gaining favor, piston pins are lapped within precise limits on the Norton abrasive-type lapping machine, Fig. 11. Strange as it may seem, Lux, the household standby, has found its place in this operation. It seems that the operator thought it would be a good idea to use Lux to soften the water used in the lapping operation, and after using it it was found that the process imparted a mottled finish to the pin. Microscopically, the character of the surface is the same as before, but apparently the action of the Lux-softened water does something to the surface which brings out high lights at different points. It is well worth noting here that recent experiments have shown conclusively that this lapping operation after grinding produces a true and almost perfect wear-resistant surface.

As noted earlier, an outstanding feature of the manufacturing set-up here is the constant development of new methods. Right now, in addition to the several specific examples discussed above, they are simplifying a complicated turret machine set-up in an effort to do the job on two separate machines, involving less initial equipment cost and admitting of more flexibility in their set-up. An inspection trip through this plant makes evident the reason why it has been characterized as one of the finest and most modern in the industry.

Parts Suppliers Earnings Show Gain Over 1928

(Continued from page 182)

themselves but have been able to carry forward technical development work, improve the machinery in their plants and generally make themselves better able to serve vehicle manufacturers at the lower costs which are constantly being demanded.

Dividends of parts and accessory companies in general are not in danger this year, study of the figures so far available indicates. Some companies will be hard put to earn as much as their dividend rates call for, but these instances will be a minority of the total. In 75 per cent of the cases studied, earnings sufficient to cover normal common stock dividends are practically certain already.

If general business starts the slow climb back to prosperity which is expected this fall and winter, automotive parts and accessory manufacturers in general are in good condition to profit by the natural benefits which will accrue from such an upswing.

Diamond Neck Auto Bolt Evolved

(Continued from page 187)

any appreciable friction between the undersurface of the head and the wood, or the nut and the wood.

This material was a piece of good, clear white oak, in which holes were drilled to fit the major diameter of the threads freely, so that they could be inserted with the fingers. The results again are in favor of the auto bolt.

Thus in all points the auto bolt is superior to the carriage bolt. It is easier to manufacture, as well as being more satisfactory in service. The tests made establish the correctness of the design as well as the formulae for calculation.

Table IV—Comparison of Torques Required to Twist Bolts in White Oak

Diam.	AUTO BOLT			CARRIAGE BOLT			RATIO
	Load	Torque Arm	Torque Lb.-in.	Load	Torque Arm	Torque Lb.-in.	
5/16	11.68	17	198.56	9.813	17	166.8	1.190
3/8	11.71	22½	263.47	10.025	22½	225.6	1.168

A NEW British military plane, known as the D.H. Interception Fighter, is equipped with a sixteen-cylinder air-cooled engine, the cylinders being arranged in four banks in form of a letter H. There are two crankshafts, which are geared down to the propeller shaft. A supercharger is used. For weight of 620 lb., the engine is said to develop more than 300 b.h.p.

JUST AMONG OURSELVES

An Inverted Adage For the Industry

"Be sure you're ahead—and then go right."

That's the inverted adage that a successful shoe merchant in Chicago has hanging in his office. He attributes the inversion to his father, who got twisted one day when bawling out an employee.

We've found some of the most beautiful byways to drive over when we've missed our road in driving around the country; and now many of these mistake-begotten byways constitute our regular routes. This shoe merchant's father did something like that when he got his phraseology mixed up.

"Be sure you're ahead—and then go right" is a good motto for any automotive company.

"Going Right" is Point Of Many Successes

IT'S better than the old one. In times of economic stress particularly, plenty of good, sound conservative organizations tend to fall behind by remaining inactive too long while making sure they're right before going ahead.

If you're ahead, you can more easily afford the time to figure out in detail just what exactly the right direction is.

Moreover, it's when you're ahead that you have the most need of going right. Everyone can count off several business instances in his own experience where automotive firms were well ahead, but failed to stay there because—having gotten well ahead of the pack—they didn't worry enough about going right.

Studious care about going

right after having gotten ahead has been responsible for building to greatness most of the outstanding corporations in American business today.

Automotive Advertising Men Have Records to Sustain

JUST received the bulletin describing the conditions of the Harvard Advertising Awards for 1930. Automotive men and companies have made

excellent showings in this competition for recognition of outstanding advertising achievement since its establishment by Edward W. Bok back in 1923.

Henry Weaver, of General Motors Corp., was one of the early winners of the research award. Ford Motor Co. has twice won recognition in the awards; once in 1927 for an advertisement competing in the group for "Advertisements Effective in Typography," and once in 1929 under the award for "National Campaigns for Specific Products." A Cadillac advertisement won an award for "Effective Use of Illustration" in 1927.

Here's hoping that 1930 will see more automotive names inscribed in this advertising Hall of Fame.—N. G. S.

We Have Lived—We Abandoned Roads

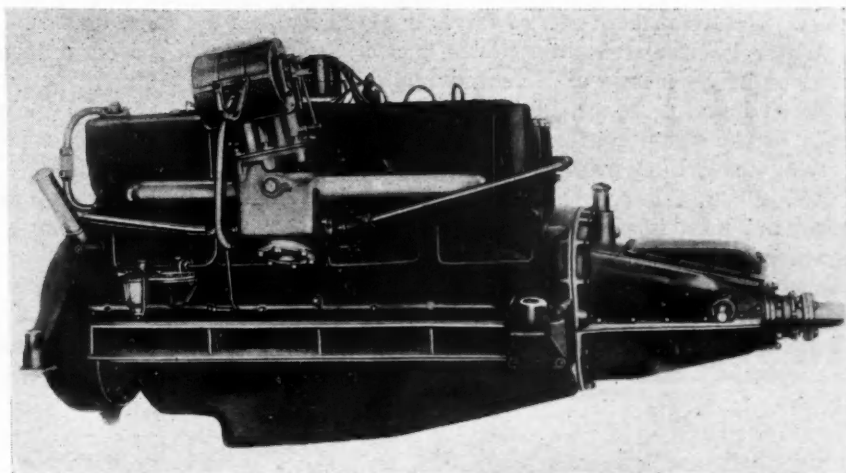
WE liked this poem, which we ran across the other day. Perhaps you will, too. It is from an anthology of University of Tennessee verse called "Contemporaries from Tennessee."

Abandoned Roads

By AMY MAY ROGERS

We are the abandoned roads.
Beside the great highways we linger.
We have faltered, stumbled in the onward march,
And now we look wistfully on.
Resigned, like old people in chimney-corners,
We watch these young roads,
Smooth of face, broad-backed, strong-muscled.
How they swagger! How they conquer all obstacles!
"Narrow," they sneer, swerving past us.
Yes, we *are* narrow. No time had our makers for broad roads.
They must press forward.
But they stirred up our dust with their laughter.
Packed it down with their tears and the sweat of their bodies.
Through the years we have bowed to their burdens.
In their triumphs, defeats; in joyous procession, in mourning,
They have deepened our ruts, they have furrowed our faces.
In silence we watch while the young roads
Lift all care from our shoulders.
Soon our last faint traces will be hidden by grasses and wild flowers.

But we have lived abundantly,
We abandoned roads.



The Lycoming eight-cylinder 165 hp. marine engine is equipped with a vibration damper + + +

Lycoming Model UE Marine Engine Develops 165 H. P.

Dual downdraft carburetion is used.

Design of the inlet and exhaust manifolds is an unusual feature of powerplant

TO meet a demand for a powerplant for motorboats capable of developing high power over long periods, the Lycoming Manufacturing Co., Williamsport, Pa., has designed an eight-cylinder in-line marine engine known as the Model UE. It has a bore of $3\frac{3}{4}$ in. and a stroke of $4\frac{3}{4}$ in., giving it a displacement of 420 cu. in. The compression ratio is 5.3, and at a speed of 3200 r.p.m. the engine is said to develop 165 hp. To prevent torsional vibration at high speeds it is equipped with a patented vibration damper.

An unusual feature is the design of the inlet and exhaust manifolds. The inlet is arranged for a dual downdraft carburetor, one carburetor outlet feeding the four middle cylinders and the other the four outer ones. The exhaust is directed from each end of the engine toward the middle, where it enters an expansion chamber surrounding the carburetor inlet and forming a hot spot. The exhaust manifold is of cast iron and is surrounded by a waterjacket of Armco iron welded in place, both the Armco iron and the welding material being immune from attack by sea water, it is claimed.

The crankshaft has five main bearings of $2\frac{5}{8}$ -in. diameter. Front and rear bearings are $2\frac{3}{4}$ in. long; the center bearing is $2\frac{3}{8}$ in. long and the two intermediate bearings are $2\frac{1}{8}$ in. long. Crankpins are $2\frac{11}{32}$ in. in diameter. To reduce the load on the main bearings when the engine is running at high speeds, the crankpins are drilled out to remove excessive weight. Main bearings are bronze-backed, babbitt-lined; connecting rod bearings consist of white metal poured directly into the steel of the rod, and camshaft bearings are bronze-bushed. The main and camshaft bearings are finish-reamed in one operation.

Lubrication is by pressure to all crankshaft and camshaft bearings. All oil leads are drilled through solid metal to eliminate the use of tubing and obviate risks of leakage at union connections. An oil cooler is mounted on the starboard side of the engine, the shell being cast integral with the cover over the core opening of the cylinder block. Contrary to the usual practice, the oil is circulated through tubes which are surrounded by the cooling water. For this arrangement the advantages are claimed that back pressure on the oil lines is eliminated, that water is not held by capillary attraction when the engine is drained, which might result in damage from freezing during cold weather, and that the core of the cooler is readily removed for cleaning.

Intake valves, which have a clear diameter of $1\frac{3}{4}$ in.,

have heads of chrome-nickel steel, while exhaust valves, with a clear diameter of $1\frac{5}{8}$ in., have heads of silchrome steel. The lift of both sets of valves is $11/32$ in.

Water is circulated through the cooling jackets of the engine by means of a gear pump with a bronze body and stainless-steel shafts. Pilot gears on the ends of the pump shafts run in oil and take all the driving load, thus prolonging the life of the pump gears. Renewable bronze bushings fitted with stuffing boxes are used in the pump body. When the engine is stopped, the pump remains filled with water, forming a seal and making the pump self-priming.

A small portion of the water from the pump is discharged into the oil cooler. The remainder flows first to the exhaust manifold waterjacket and from there to

a distributing plate running the full length of the cylinder block. The distributing plate is provided with graduated holes and admits water at various points in proper proportions to provide uniform cooling throughout the entire length of the block. After passing through the cylinder block the water is emptied into the exhaust line.

Standard equipment includes a Joe's reverse gear, a Holley downdraft carburetor with AC flame arrester, Delco-Remy starting, lighting and ignition system and AC mechanical fuel pump. A standard S. A. E. tachometer fitting is provided and provision is made for a thermo gage connection in the cylinder head.

The weight of the engine complete with all accessories is 1140 lb.

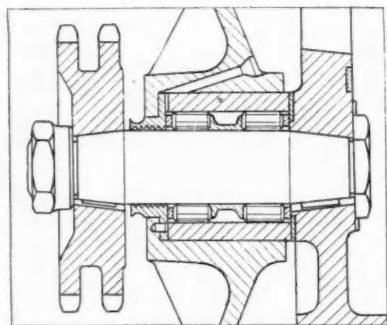
Harley-Davidson Roller Bearings Designed to Save Weight and Space

HARLEY-DAVIDSON MOTOR CO., Milwaukee, Wis., which is making extensive use of roller bearings in its motorcycles, has recently placed these bearings on the market for use in the products of other manufacturers.

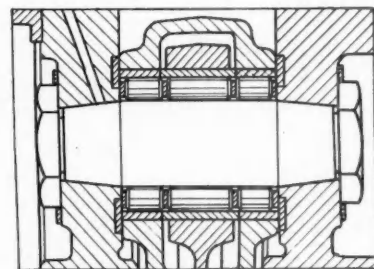
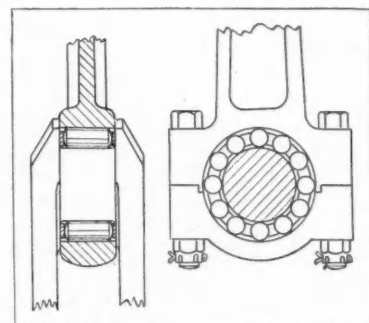
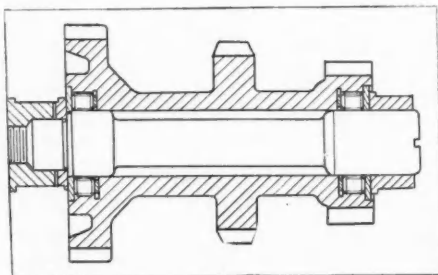
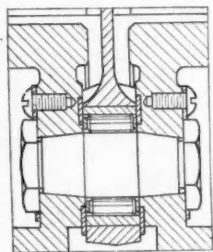
These roller bearings are of the cylindrical type and therefore are intended for radial loads only. The rollers are made from S.A.E. No. 52100 chrome ball steel, and after hardening and grinding are lapped to a high degree of finish. After lapping the rollers are graded in steps of $1/10,000$ in. to a maximum of $\frac{1}{4}$ in. plus $1/1000$ in. and a minimum of $\frac{1}{4}$ in. less $1/1000$ in. The rollers are made in eight lengths, from 0.280 to 0.736 in.

Cages are machined from solid bar steel and hardened. Units comprising cages and rollers are manufactured to suit shaft diameters of from $\frac{7}{8}$ in. to $2\frac{5}{8}$ in., and are especially adapted to designs in which the rollers are mounted directly on a hardened shaft. In many cases the separate outer race is also eliminated, the rollers running directly in a hardened part. Considerable weight and space are thus saved, making the bearings especially suitable to aircraft.

These bearings are being used regularly for main and crankpin bearings of engines with bores of up to $3\frac{7}{16}$ in. and turning over at 4000-4800 r.p.m. With double and triple rows of rollers the capacity of the bearings is increased proportionally.



Applications of bearings to gasoline engines and transmissions. Left—Showing bearings fitted in a split connecting rod head. Lower left—Bearing fitted in a solid connecting rod head. Lower right—Three bearings on the crankpin of a V-engine. Right—Main-bearing application. Below—Application to a transmission cluster gear



Hydrogenation Process Adopted for American Fuel Production

Sixteen refiners to use German method which makes possible 100 per cent conversion of crude petroleum into gasoline + + + + +

FROM an announcement made in the course of the week it appears that a development in motor-fuel production of great interest to the American automotive industry is about to take place, viz., application of the hydrogenation process to the heavier constituents of petroleum to convert them into lighter and more volatile liquid fuels. Apparently practically the whole American petroleum refining industry will participate in this development.

The hydrogenation process for the production of motor fuels has been under development in Germany ever since the war, one of the principal workers in this field having been Dr. Friedrich Bergius. The Germans, since there are practically no petroleum sources in their country, applied the process to the treatment of coal, and Bergius has described his process as the liquefaction of coal. Bergius' and other German patents relating to this process for producing motor fuel were acquired by the I. G. Farbenindustrie, the German dye trust. During the past few weeks this concern has published an announcement that synthetic gasoline from coal is now available at filling stations throughout Germany.

About two years ago the Standard Oil Co. of New

Gasoline is not the only product of the hydrogenation retort.

After hydrogenation, the product can be distilled and lubricating oil, gas oil, Diesel engine oil and kerosene of superior quality may be obtained, it is claimed.

And, aside from the crude oil, the only material required is hydrogen, of which there are unlimited quantities in water.

Jersey entered into an agreement with the I. G. Farbenindustrie according to which the two companies were to pool all of their patents on hydrogenation and to form a holding company for these patents which would be jointly owned but in which the Standard Oil Co. would have a controlling interest. German patents were excluded from the deal.

It is a well-known fact that all of the motor fuels at present commercially used in this country consist—aside from impurities—of only two elements—carbon and hydrogen. What distinguishes these fuels from others which cannot be used in the conventional type of internal combustion engine, either because they are of too low volatility or because they are solid at normal atmospheric temperatures, is that the proportion of hydrogen to carbon is higher in the motor fuels. It therefore occurred to the scientists that if the hydrogen could be added in the heavy fuels, they could be converted into high-grade motor fuels. Of course, it is not sufficient to merely add the hydrogen, but the atoms of the latter must be chemically combined with the fuel molecules, so as to change the latter from one of the forms characteristic of heavy fuel into one characteristic of a light fuel. This can be effected by subjecting the heavy fuel and hydrogen to very high pressure and high temperatures in the presence of suitable catalysts.

In the United States the conversion of coal into motor fuel does not seem to offer any particular advantages at the present, because petroleum is still being produced in abundance. Since petroleum is much closer to usable motor fuel than coal in its properties, not nearly so much hydrogen needs to be added and the process is simpler, which also depends on the fact that petroleum is liquid and therefore can be more readily exposed to the action of hydrogen than can coal, which must first be pulverized.

At the present time, when it is desired to obtain

the maximum possible amount of motor fuel from a certain quantity of crude oil, the cracking process is applied, by means of which between 40 and 50 per cent can be converted into gasoline. By the use of the hydrogenation process practically 100 per cent of the crude can be converted.

The announcement referred to in the introductory paragraph is to the effect that the Standard Oil Co. of New Jersey has just completed its first commercial hydrogenation plant—the first in the United States, by the way—at Bayway, N. J. This plant has a capacity of 5000 bbl. of motor fuel per day.

The Bayway plant is to be put in regular operation immediately, and complete records are to be kept. A preliminary report of its operation will be made public probably about the middle of September. It is claimed as one of the advantages of the process that the qualities of the product are under much better control than where gasoline is produced by direct distillation or by the cracking process. Gasoline, moreover, is not the only product of the hydrogenation retort. After hydrogenation, the product is distilled, and lubricating oil, gas-oil, Diesel engine oil and kerosene of a superior quality may be obtained, it is claimed. Aside from the crude oil, the only raw material required is hydrogen, of which there are unlimited quantities contained in water.

When the agreement with the German dye trust was first made, the Standard-I. G. Co. was formed to hold all patents on the process outside of Germany.

Now the United States patents have been transferred to another company, the Hydro-Patents Co. It is announced that 16 of the largest refiners have become interested in this new company through stock ownership, and representatives of most of them are now in Germany studying the working of the process there at the Leuna plant of the Farbenindustrie. It is stated that the process has been so far developed that it is now on a competitive basis with other methods of producing petroleum products and it is hoped to further improve it in the future, both as regards quality of the product and economy of operation.

According to the announcement, only slight changes are required in modern large-size American oil refineries to adapt them to the working of the new process, and while the companies which already have joined the Hydro-Patents Co. represent about 80 per cent of the capacity of the American motor fuels industry, it is not intended to restrict the use of the process to them, but to work out means of applying it commercially in small plants, so that any of the smaller refineries wishing to do so can avail themselves of its use on a license basis.

Reference is made in the announcement also to the application of the process to the production of motor fuel from coal, but this is said to be a more remote commercial possibility. However, the knowledge that means are now at hand making it possible to rely on the huge coal reserves of the country for motor fuel ought to be very reassuring to the motor industry.

Mechanical Properties of Bethalon Steel

WITH the increasing use of Bethalon steel, a corrosion-resisting steel with good machining properties, the Bethlehem Steel Co. has had many requests for data on the mechanical properties of this steel. The figures are reproduced herewith.

Average physical properties of Bethalon in the annealed condition:

Yield point, 57,000 lb. per sq. in.
Tensile strength, 90,000 lb. per sq. in.
Elongation in 2 in. 28 per cent.
Reduction 50 per cent.
Brinell number 174.

Physical properties of Bethalon in the fully heat treated condition:

Yield point, 158,000 lb. per sq. in.
Tensile strength, 174,000 lb. per sq. in.
Elongation in 2 in. 12 per cent.
Reduction 29 per cent.
Brinell number 352.

The alloys of Bethalon permit of economical mechanical working either hot or cold. Ordinary forging operations are best performed by pre-heating to 1300 deg. Fahr. to 1400 deg. Fahr. and raising to a maximum of 2150 deg. Fahr., the allowable finishing temperature being 1750 deg. Fahr. Since the metal does not air-harden appreciably, forgings may be

cooled in still air, after which a hardness of 220 to 240 Brinell can be expected. At this hardness there is a partial sacrifice of machinability; however, with the addition of an annealing operation at 1400 deg. Fahr. and cooling in still air best machining properties are attained, the hardness being 172 to 174 Brinell.

Bethalon can be smooth turned at 200 surface feet per minute, while satisfactory threads are cut at 150 to 175 surface feet per minute. Such operations as turning, drilling, threading, tapping, and parting are accomplished by the same methods as used with ordinary screw stock.

Heading operations have been performed on cold-drawn bars, and no subsequent annealing was necessary to assure good machining properties. The articles in question were drilled and tapped without difficulty, this being indicative of supreme tests in machinability. Bright finished wire has been drawn from 1/4-in. round rods down to 0.020 in. and there is every indication that no difficulty will be encountered in production of finer sizes.

At the present time this steel is manufactured in the following forms: Annealed bars, within bar-mill sizes; ground bars, 1/4 to 4 in. round; cold-drawn rods; heat-treated bars; forging billets; drop forgings; press forgings, and wire rods.

Standardized Trade Customs Adopted by Steel Foundries

Multiplicity of forms now current to be replaced by simplified sales contract, acceptance of order and quotation record

A SIGNIFICANT advance in the relations between the buyers and sellers of steel castings is marked by the Steel Founders Society of America, Inc., 932 Graybar Building, New York, in their announcement of the establishment of Standard Trade Customs for the steel foundry industry. A partial list of the 10 accepted principles is given below. Ten such articles are printed on the reverse side of the standardized form to be used by the foundry.

To further aid simplification, standard forms for the sales contract, acceptance of order and quotation have been adopted. It is expected that ultimately the majority of the steel founders will use these forms in place of the multiplicity of forms now current. Unquestionably, the adoption of standard trade customs, as well as the use of standard forms, should prove to be of mutual advantage to both the buyer and seller of steel castings.

A—All quotations are made and all steel castings are sold upon the following terms and conditions:

1. Quotations:

B—All requests for quotations shall give actual or estimated rough weights of the castings, but estimated weights shall not be used as a basis for billing.

C—All quotations on steel castings shall be exclusive of pattern equipment: the latter, if made by the foundry or requiring alterations, shall be an extra or separate charge to the purchaser.

D—Unless otherwise specified, castings are sold as unmachined castings. Terms—Net cash, 30 days from date of invoice. F.O.B. Foundry.

E—When the quotations involve the making of piece prices, approximate weights shall be agreed upon, and quotations shall be subject to revision on any variation from the original design.

F—Unless specified, any quotation containing more than one class of work, at an average price per pound, is furnished with the understanding that acceptance is for the entire lot, and quotations are good for thirty (30) days only, and arrangements for pattern equipment shall be provided for within that time.

2. Pattern Equipment—General:

G—To eliminate errors patterns should be painted in accordance with the accepted standard practice (printed on the form).

I—All transportation charges on pattern equipment to and from the foundry shall be paid by the purchaser.

J—All packing and crating cost for transportation of patterns to and from the foundry shall be paid by the purchaser.

4. Pattern Equipment Charges:

N—Subject to purchaser's approval, pattern changes or repairs which become necessary on account of ordinary wear shall be made at the purchaser's expense.

5. Changes, Alterations and Cancellations of Orders:

P—Changes in orders shall be confirmed in writing by the purchaser.

Q—Cancellations of orders must be mutually agreed to by the foundry and the purchaser.

8. Specifications:

W—When chemical specifications, except phosphorus and sulphur, are imposed by the purchaser, the foundry shall not be held on physical tests and vice versa, except by agreement.

9. Arbitration:

X—Any controversy or claim arising out of, or relating to, a contract or the breach thereof shall be settled by arbitration, in accordance with the rules, then obtaining, of the American Arbitration Association, and judgment upon the award rendered may be entered in the highest court of the forum, State or Federal, having jurisdiction.

10. Cooperation:

Y—The foundry or producer will, whenever possible, arrange for the inspection of his plant equipment and product in order to acquaint the purchaser with the foundry problems, and to assure him of the desire and advisability of close cooperation between them to the end that a quality product may be furnished and best service rendered to the purchaser.

Books for the Business

Group Incentives

By C. C. Balderston, Ph.D., University of Pennsylvania Press, 171 pp., 11 illus., \$2.50.

CONCLUSIONS regarding the important elements of current group bonus and gang piece work systems based upon a personal survey and analysis by Dr. Balderston, Assistant Professor of Industry, University of Pennsylvania, are presented interestingly in this book. The author first establishes that for interdependent jobs, which form the field for these incentives, a reduction in direct labor cost has been universally experienced wherever group payment has been substituted for day work. Moreover, the average bonus earned is said to be between 20 per cent and 40 per cent of the base wage.

An unusual comparison of certain wage payment plans given in Chapter 4 should prove of real practical utility not only in the selection of earning curves for a new installation, but in the analysis of the present system as well.

Life Expectancy of Physical Property

By Edwin B. Kurtz, E. E. The Ronald Press Company, New York, N. Y.

IN this book the author applies to the life problems of physical property the methods which have long been successfully used by life insurance actuaries in dealing with the problems of human mortality. He compiled mortality records of physical properties over a period of 14 years and embodied them in the form of mortality tables. The life characteristics of actual physical properties were calculated from these data and analyzed, and such relations as could be readily discovered were noted. The author expresses the view that many of these relations may prove to be laws and so permit of a scientific determination of the life expectancy of equipment and its attending problems. The following list of chapter heads will give a good idea of the contents of the book: Mortality Data for Equipment and Machinery Methods of Compiling Mortality Tables, Development of Mortality Curve Types, Fre-

quency Curves of Replacement of Original Units, Equations of the Seven Type Mortality Curves, Average Life, Expectancy and Probable Life, Annual Renewals.

Die Berechnung einer Zweitakt Dieselmachine

By Dr. W. Haeder, Inf. Published by Richard Carl Schmidt & Co., Berlin W-62, Germany.

THIS book deals with the design and the strength calculations of a two-stroke Diesel engine with solid injection. It is not an automotive type Diesel engine, however, but a stationary four-cylinder type of 440 hp. at 200 r.p.m. The book contains 187 drawings of details and assemblies. In connection with each part a general discussion of the requirements is given, and the necessary dimensions are then calculated on the basis of "mean values" or experience factors.

The Aluminum Industry

By Junius David Edwards, Francis C. Frary and Zay Jeffries, respectively assistant director of research, director of research and consulting metallurgist of the Aluminum Company of America. Published by McGraw-Hill Book Company, Inc., New York.

THIS is a two-volume work on the various phases of the aluminum industry, one of the volumes bearing the sub-title Aluminum and Its Production, and the other the sub-title Aluminum Products and Their Fabrication. In addition to the authors whose names have been mentioned, various other members of the staff of the Aluminum Company of America have cooperated in the production of the work, which may be considered as highly authoritative. Although a considerable number of books on aluminum have been published in the past, many of these are not as reliable and thorough as might be desired, and, besides, the industry is constantly progressing and new information develops of a kind that is suitable for inclusion in handbooks of the industry.

The first volume deals entirely with the production of aluminum from its ores and therefore contains little of direct interest to the automotive engineer. It may be pointed out, however, that the history of aluminum production is traced with great care and credit, for having been first to produce metallic aluminum is accorded to the Danish scientist Oersted, instead of to Woehler, who has been given credit for it in most earlier textbooks. Oersted's researches on the subject are well authenticated. Until recently it was generally believed that metallic aluminum could not be produced by the method employed by him, but recent experimental work has shown that this can be done, so that Oersted's claim that he obtained a lump of metal resembling tin evidently must be allowed.

Bookshelf

The volume on Aluminum Products and their Fabrication is introduced by a very readable sketch of the commercial history of aluminum by S. K. Colby. In this the numerous difficulties encountered in introducing aluminum in the industries are interestingly told. When the cost of the metal had been cut to 25 per cent by the introduction of the Hall process of refining, quotations of wholesale prices still elicited no interest. The metal was entirely new as a material for the industries and those who were willing to try it had need only for small quantities. The result was that those who had financed the development of the reduction process were compelled to engage also in the production of the metal in semi-finished forms, such as sheets, bars, wire, etc. It appears from Mr. Colby's account that while the development of the market for aluminum in this country has been quite rapid, it has not been continuous, periods of overproduction having alternated with periods of a shortage in the supply of the metal. Occasionally the demand fell off materially as a result of a general business depression, while in other cases outlets which had been established were lost again because of a change in competitive development or a change in market requirements.

This volume deals with the general properties of aluminum, aluminum alloy systems, methods of working and finishing aluminum, and the various applications of the metal. A chapter on the Future of Aluminum by Zay Jefferies, from which it appears that there is no likelihood of any shortage of the raw materials from which the metal is made, concludes the volume.

Spezial-Last Automobile Band II—Kraftomnibusse

(Special Commercial Vehicles Vol. II—Motor Buses) by L. Betz, published by Richard Carl Schmidt & Co., Berlin W-62, Germany.

THIS is a work which is largely of a descriptive character, with profuse comments by the author on various features of design, on the products described and on events in the development of bus transportation in Germany and elsewhere.

The first chapter deals with generalities and the development of omnibus types, and the author points out that in addition to the conventional gasoline bus with mechanical transmission there are five other types, viz., gas-electric, Diesel-engined, gas-generator, steam-powered and trolley buses. These different types are discussed in this same chapter, numerous different constructions being illustrated and described. In other chapters motor bus chassis and bus bodies produced in the different manufacturing countries are dealt with. Then there are chapters

devoted to school buses and special buses for long distance travel, on conditions of winter operation, and on tires, wheels and brakes. It will be gathered from the foregoing that the book is not an engineering text but it contains a great mass of material on buses produced in the various manufacturing countries and nearly 600 illustrations, the major part of them reproductions of photographs. The typography is first-class.

Kolben im Kraftfahrzeugbau

Pistons in Automobile Construction by Dipl. Ing. Ernst Mahle, Publisher: Verlag Deutsche Motor Zeitschrift, Dresden-A. 19, Germany.

THE author, in this treatise, gives a good review of the present situation relative to the development of pistons. No historic treatment of the subject is attempted. The writer speaks of the qualities today demanded of a good piston, such as low weight, easy running, adequate heat dissipation, silent running, etc., with their bearing on other parts of the engine. He describes typical modern pistons of cast iron, magnesium and aluminum, and deals with three methods of allaying piston slap. An account is given also of the various special designs of pistons developed in recent years. The pamphlet is well illustrated.

Patents, Trademarks and Copyrights

By Oscar A. Geier. Published by Richards & Geier, 274 Madison Ave., N. Y.

THIS is a fifth edition of a concise work on the law and practice relating to patents, trademarks and copyrights, which was written for the use of inventors, manufacturers, lawyers, etc. The patent law section of the book explains who may obtain a patent, what may be patented, the importance of specification and claims, patent interferences, reissues, appeals, infringement suits, etc. The trademark end covers trademarks in general, valid trademarks, invalid trademarks, unfair competition, state registration, interferences, oppositions, appeals, infringements, etc.

This fifth edition has been completely revised and brought up to date to conform with the changes of the law and practice since the fourth edition was issued in August, 1928. In addition to facts about American patents and trademarks, the book also gives information about foreign patents and trademarks which will be of particular interest to manufacturers who export.

Direct Advertising Guide

Edited by J. C. Apsley,
The Dartnell Corporation, 320 pp., \$2.25.

THE 1930 issue of this guide for direct advertisers is the second annual edition with a broadening of scope and treatment. As usual an interesting and valuable section is that on Mailing List Source Data, supplemented by a complete index.

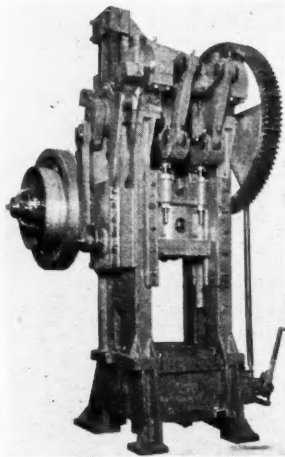
NEW DEVELOPMENTS—AUTOMOTIVE

Improved Bliss Single Crank Toggle Presses

SINGLE crank toggle drawing presses Nos. 1½ to 3¾-B built by the E. W. Bliss Company, Brooklyn, N. Y., have been redesigned to include the following recent developments:

The outboard bar guide for the crosshead has been discarded in favor of a gibbed guide. A further improvement is the substitution of a forked arrangement for the overhung pins of the short link to stiffen the blank-holder drive.

A full automatic friction clutch control is built into the right hand leg of the machine. This device



supplies either hand or foot control of the machine without the use of tools or any intermediate strips. When using foot control the handle is stationary but so arranged that it may be instantly used to stop the press on the way down.

The flywheel, which runs freely on the shaft when the press is idle, is mounted on a pair of Timken bearings and provided with a new friction clutch having three steel driving disks with interwoven asbestos facing.

The saving in floor space right to left amounts to 22 in. for the No. 1½ and 31 in. for the No. 3¾-B.

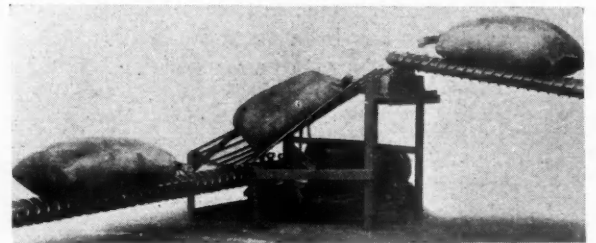
Clark Power-Driven Tiering TwinVeyor

A NEW portable, flexible, power-driven elevating and tiering conveyor, known as the Clark TwinVeyor, has been placed on the market by the Clark Trucktractor Co., Battle Creek, Mich. Two tubes with external helices upon them are turned toward each other by a power head, and anything placed upon them travels forward rapidly. So far the TwinVeyor has been used mainly for handling raw materials and finished products in bags, bales and bundles, but it is used also in plants handling crates and boxes. The manufacturers believe it has a field in automobile body plants in conveying, elevat-

ing and stacking baled hair and other upholstery materials.

A standard unit consists of six 8-ft. dual sections and a power head. Each additional section is joined to the assembly with an automatic lock. It is easily shifted about by one man, and the entire 50-ft. line can be assembled or disassembled in six minutes, it is claimed. Any joint can swing through a 15 deg. angle horizontally, and can be tilted 15 deg. upward and 10 deg. down. In elevating operations, sections may be supported by material that has already been stacked.

Recent improvements include a hurdle section, which permits any number of 50-ft. units



to be hooked together to form a continuous line of any desired length. The traveling load hurdles each power head in the line. Right and left helical chutes are provided for shunting the load from one TwinVeyor line to another wherever right-angled turns are required.

Cutler-Hammer Develops Three-Position Pilot Switch

MOTOR-DRIVEN pumps, compressors and similar machines which are controlled by an automatic pilot device such as a float switch, pressure switch, time clock, etc., often require some means of starting and stopping the motor manually. For this purpose, Cutler-Hammer, Inc., Milwaukee, Wis., have developed a new three-position pilot switch. The operating lever can be placed in either the "automatic," "off" or "manual" position. When turned to "automatic," the automatic pilot device is in circuit and normal, automatic operation is obtained. With the lever in the "off" position, the pilot circuit is opened and the motor cannot be started from any other control point. Turning the lever to the "manual" position closes the control circuit direct and the motor will run continuously regardless of any other control devices as long as there is operating voltage on the line.

PARTS, ACCESSORIES AND PRODUCTION TOOLS

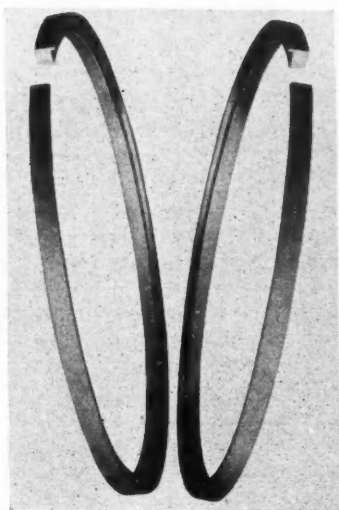
Tungtite Compression Rings Offered by Perfect Circle

ANNOUNCEMENT is made by the Perfect Circle Co., Hagerstown, Ind., that it now will manufacture the Tungtite piston ring for the general market.

Although Tungtite rings are new to the industry as a whole, they have long since passed the experimental stage. Several of the leading automobile manufacturers of the country are using Tungtite rings as standard equipment in all or a large part of their production. One manufacturer

has used them continuously for over three years and with outstanding success.

Tungtite compression rings are always used in pairs. Each ring is counterbored on one edge, forming an "L"-shaped cross-section. The rings are installed in a special ring groove with the counterbored edges facing each other. The Tungtite piston ring groove is machined with an



annular projection or "torque" in the center which is lower than the outer walls of the groove. This "tongue" occupies the space between the counterbores, separating the rings and forming a "T"-shaped cavity between the rings which acts as a reservoir for oil. The opening between the rings is a narrow passage, which forms a direct communication between the oil film on the cylinder wall and the reservoir behind the rings.

G.E. Develops Portable Aircraft Oil Heater

AS an addition to its line of airport accessories, the General Electric Co. announces a single-heat, portable immersion heater, Y-2839, for warming engine oil preparatory to starting. It is a simple and low-priced companion unit to the Y-2092, a three-heat device for similar application.

The new unit is rated at 750 watts and operates on 110-volt circuits, either alternating or direct. It consists of a heating element twisted into the

form of helix so that the effective heating length is only about 10 in. This permits its use in oil tanks where larger heaters cannot be inserted.

A 35-ft. length of lacquered-braid cord is part of the equipment, together with an attaching plug and a metal guard ring. The cord is said to withstand oil, gasoline and hard usage.

Gallmeyer & Livingston Hydraulic Feed Grinder

GALLMEYER & LIVINGSTON CO., Grand Rapids, Mich., has added a new size of surface grinder with hydraulic feed, known as the No. 2. It has a table working surface of 6 in. by 18 in. The machine is illustrated herewith.

By means of a control lever at the front of the base the table feed can be varied from nothing

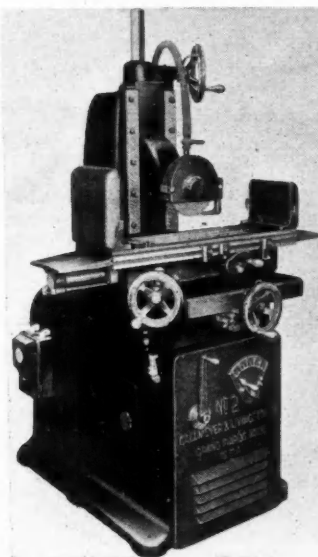
to 60 ft. p. m. or more. Cross feed can be varied from 0.01 to 0.125, and can be made to operate at either end or at both ends of the stroke, as desired. It is also operated hydraulically.

When the automatic hydraulic feed is in operation, the hand wheel and pinion for hand operation of the table are entirely disengaged. When the machine is to be operated by hand, the piston

rod is disconnected from the table, to eliminate drag, and power is applied through a helical pinion. The table movement is started and stopped by a crank handle at the front of the base on the left.

Base and upright ways for the head are made in one piece, for maximum rigidity. The base houses the motor, the hydraulic unit with its control valve, and the oil tank for the hydraulic drive. Headways are well protected to keep out dust and dirt, and sticking of the head is further provided against by placing the elevating screw centrally between ways and balancing the weight of the head and parts supported from it in front and back of the ways.

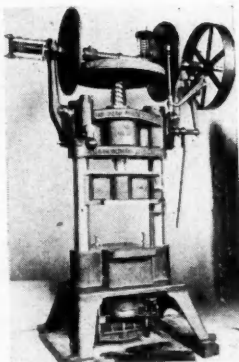
The standard size of wheel for this machine



is 8 by $\frac{1}{2}$ in. but the spindle is said to be sufficiently large and rigid to permit of the use of larger wheels. Work up to $9\frac{1}{2}$ in. in thickness can be placed under the standard 8-in. wheel. A cross feed of $6\frac{1}{2}$ in. is provided, so that a wheel of $\frac{1}{2}$ -in. face will clear the working surface of the table on both sides.

Heavy Pillar Type Percussion Press

ONE hundred tons capacity with 25 strokes per minute is provided by the No. 14-10B patented pillar type percussion press added by



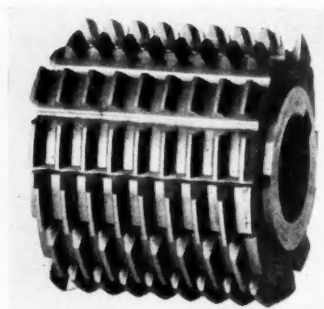
the Zeh & Hahnemann Co., Newark, N. J., to supplement their 50 and 75 ton models. It is adaptable for light metal work of large area, for grinding wheels, and pre-pressing Bakelite and other molded materials.

A pneumatic ejector (patented) unloads the finished work, thus assuring high output. The distance between up-rights is 30 in. Driving

motor is of 5 hp. capacity. Net weight 7500 lb.

Barber-Colman High-Production Hob

BARBER-COLMAN Company, Rockford, Ill., has marketed a new hob which embodies two variations from conventional practice. An investigation showed that the tips of the teeth of the ordinary hob do by far the greatest amount of work in removing metal, and it was evident



that if these tips could be widened they would be strengthened. This is accomplished in the new hob by assuming a pitch diameter for the gear to be cut smaller than the actual pitch diameter, and laying out the profile of

the hob on the basis of this assumed larger pitch diameter. This makes the pressure angle of the hob smaller than that of the generated gear, gives wider tips on the hob teeth, and makes the hob teeth narrower at the base, without disturbing the outline of the generated gear teeth.

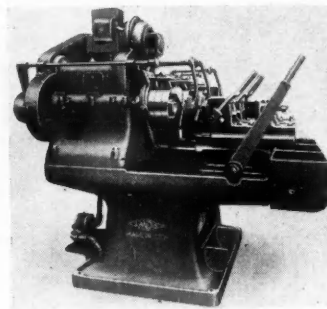
The other variation referred to produces a freer cutting action. Ordinary hobs have equal clearances on both sides of the teeth, but this often produces a dragging effect on the leaving

side. A special attachment on the backing-off machines at the Barber-Colman plant compensates for this effect by making the clearances unequal.

Two other novel features of this hob are that straight gashes are used, producing teeth having faces at an angle with the line of the lead helix, and the teeth are sharpened with a considerable hook instead of the customary radial face. Compensation was made in the tooth form of the hob for the disturbing influences of the straight gash and the face hook.

Landis Bolt Factory Threader Improved

THE addition of a constant speed motor drive and a pick-off gear box are among the important improvements in the newly redesigned bolt factory threader built by the Landis Machine Company, Waynesboro, Pa. It is a triple spindle, high production bolt threading machine



available in 1 in. and $1\frac{1}{2}$ in. sizes. With the new gear box it is possible to obtain the most efficient threading speed for any particular job, fifteen threading speeds ranging from 38 to 271 r.p.m. being available with eight sets of

interchangeable gears. Other speeds can be obtained by the substitution of different gears. All shafts in the gear box are of alloy steel and mounted on anti-friction bearings. All bearings are lubricated by the Alemite system.

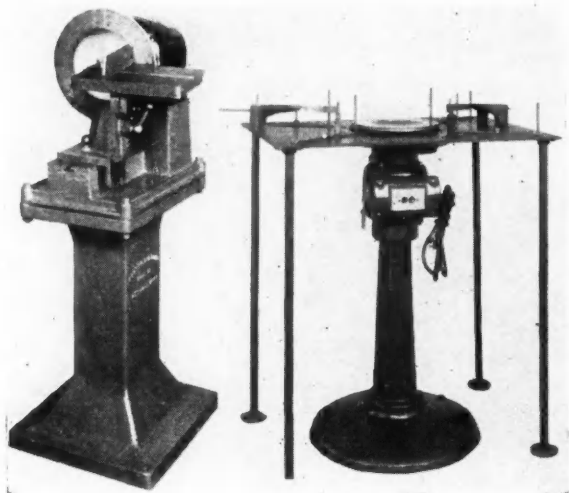
A low speed, low pressure, large volume pump, belt-driven from a constant speed shaft floods the chasers and work with coolant. The entire coolant system has been redesigned to give a larger volume of coolant to the work at all cutting speeds. The constant speed motor is direct-connected to the gear box by means of a silent chain.

"Modern" Diamond Lapping Machine

A DIAMOND lapping process for finishing cemented tungsten-carbide tools is offered in the vertical and horizontal type lapping machines, type V-1 and H-2 respectively, which have been placed on the market by The Modern Diamond Tool Co., Detroit, Mich. The chief feature of these machines is the diamond lapping tool, available in any desired form, made by a patented method of impregnating the surface structure of the tool with diamond powder.

The V-1 machine is provided with a cross

slide, horizontal, vertical and angular adjustment. The table may be tilted 20 deg. down and 10 deg. up, while the angle gage provides



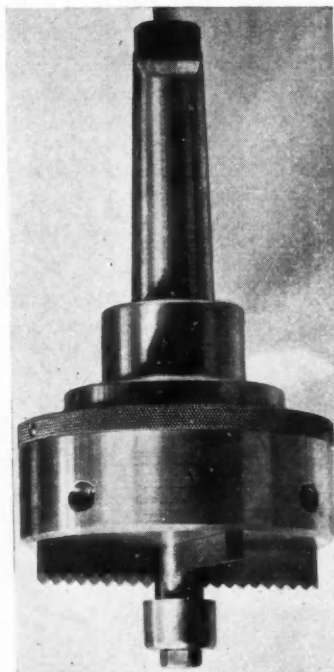
an adjustment of 45 deg. right or left. Overall dimensions 24 x 26 x 44 in.; net weight 215 lb.

The motor is $\frac{1}{2}$ hp. rating at 1725 r.p.m. D.-C. or 60 cycle A.A. for both machines.

The H-2 machine with table has overall dimensions of 36 x 24 x 38 in. Net weight 325 lb. Both machines equipped with an 11 in. diamond lapping wheel.

Mummert-Dixon Compound Spot-Facing Tool

MUMMERT-DIXON CO., Hanover, Pa., has placed on the market a compound spot-facing tool designed for the quick and accurate facing of small bosses. This tool has a set of



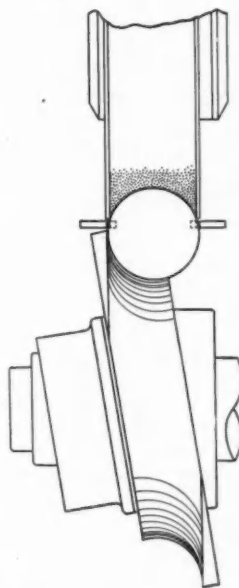
roughing and a set of finishing cutters. The roughing cutters have saw-tooth cutting edges which are claimed to quickly break up the hard scale on cast iron or steel and to cut the bosses down to approximately the required size in short time. These roughing cutters are movably arranged in the head, so their cutting faces may be set ahead of the finishing cutters and do all the rough-cutting without the finish cutters touching the work. When the rough-

ing work is done, these cutters are withdrawn, and the finishing cutters then project beyond the roughing cutters, ready for the finishing work. Withdrawal of the roughing cutters is accomplished without stopping the machine, by merely grasping the knurled adjusting ring with the hand.

Spherical Work Ground by the Centerless Method

ACCURATE grinding of spherical work such as balls of hardened steel, cast iron, monel metal, glass, casein, hard rubber and bakelite

is the latest development in centerless grinding according to an announcement by the Cincinnati Grinders, Inc., Cincinnati, Ohio.



The fundamental principles involved in centerless grinding operations are employed except that the regulating or feed wheel is arranged somewhat differently. As illustrated, the grinding and regulating wheels are both trued radially for ball grinding. In order to generate a true sphere on each ball, the regulating wheel is mounted on a special collet at an angle of 12 deg. to the axis of the regu-

lating wheel spindle. This produces a constantly varying inclination of the regulating wheel relative to the grinding wheel axis as the regulating wheel spindle revolves.

On one particular job, grinding a 1 in. ball, the work is manually loaded and unloaded from the fixture, all other operations being automatic. These balls are ground in two cuts, the total stock removal being 0.008 in. to 0.010 in. Limits for roundness are held within 0.002 in. and for size to plus or minus 0.0005 in. with an output of 10 pieces per minute per cut.

Hercules Major Drills for High Manganese Steel

PRODUCTION drilling of high manganese steel is said to be facilitated by Hercules Major drills, according to the recent announcement by Whitman & Barnes, Inc., Detroit, Mich. This new drill is made of a special steel high in cobalt and tungsten. The web is heavier and the twist but two-thirds the length of regular taper shank drills, providing a rugged and heavy construction. The drill is pointed with a 68 deg. angle while the cutting lip has been blunted to strengthen the cutting edge.

The results of tests under actual production conditions on manganese steel of 10 to 15 per cent content and 1 to 1.50 per cent carbon have been summarized in a booklet, "How to Drill High Manganese Steel," now being distributed by them.

Automotive Oddities—By Pete Keenan

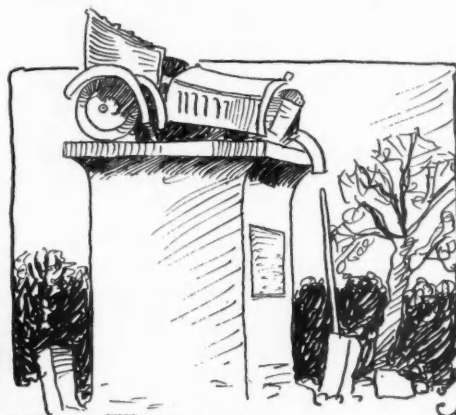
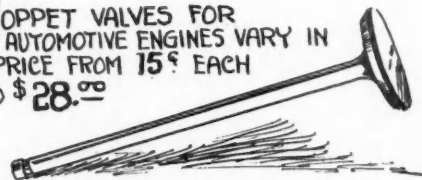


YES—THERE ARE
AUTOMOBILE DEALERS
IN VENICE, ITALY.

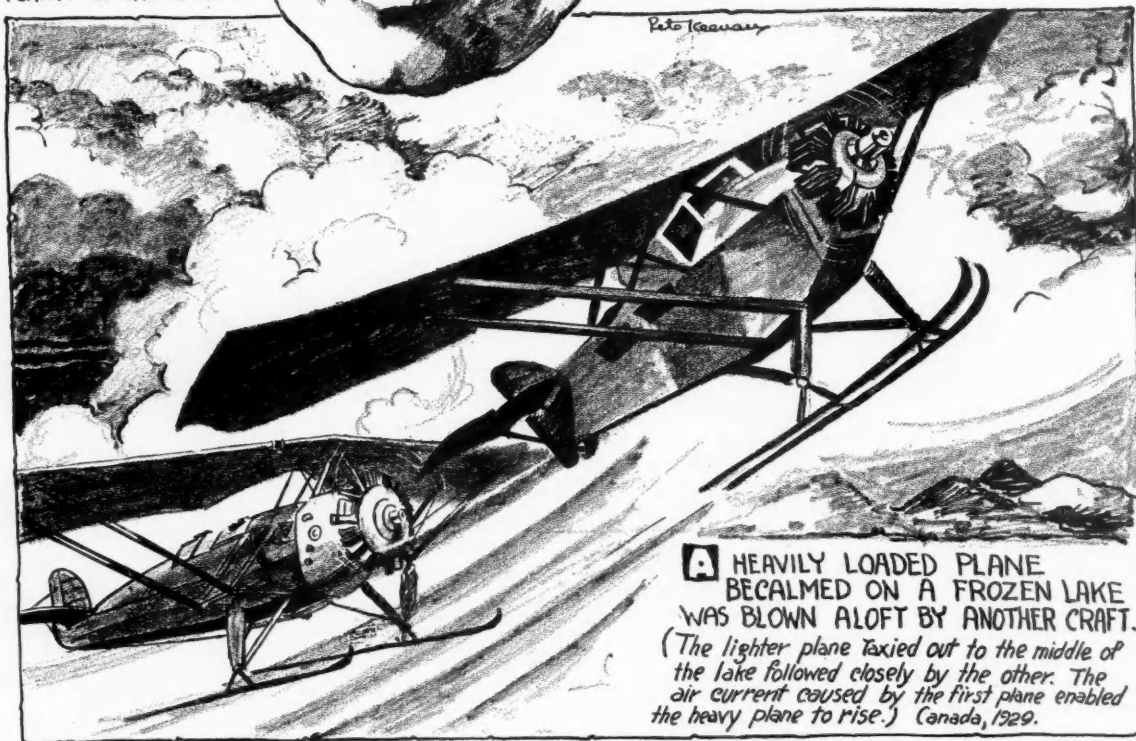
WILLIAM C. DURANT
IS THE ONLY MAN WHO,
AT DIFFERENT TIMES
HAS CONTROLLED THE
LARGEST CARRIAGE,
WORKS AND AUTOMOBILE
PLANTS IN THE U.S.A.



POPPET VALVES FOR
AUTOMOTIVE ENGINES VARY IN
PRICE FROM 15¢ EACH
TO \$28.⁰⁰



AT DANGEROUS SPOTS ON THE ROADS
IN VENEZUELA WRECKED CARS ARE
PLACED ON PEDESTALS AS A WARNING.



A HEAVILY LOADED PLANE
BECALMED ON A FROZEN LAKE
WAS BLOWN ALOFT BY ANOTHER CRAFT.
(The lighter plane taxied out to the middle of
the lake followed closely by the other. The
air current caused by the first plane enabled
the heavy plane to rise.) (Canada, 1929.)



NEWS OF THE INDUSTRY

Durant Officials Retire From Office

Extensive Changes Fore- cast in Announcement From Controlling Interest

LANSING, Aug. 7—Announcement of the retirement of high Durant officials and of the association of prominent European motor car manufacturers with Durant Motors, Inc., in extensive manufacturing operations in the Lansing plant was made late Wednesday by William C. Durant.

Mr. Durant's statement here included the announcement of a complete reorganization of the executive personnel. This included the retirement of A. I. Philip, chairman of the board; Frederick J. Haynes, president; J. A. Nichols, Jr., vice-president, and R. T. Hodgkins, general sales manager. Ralph A. Vail, vice-president, remains with the company as production manager.

The automobile magnate characterizes his statement as "a deal of great importance to the entire automobile industry and one which will affect Lansing most favorably."

Mr. Durant's statement here was interpreted to mean that possibly the Mathis car, a small French model, would be manufactured here for American trade. Mr. Durant has been driving a Mathis in his recent visits to Lansing. (For a brief description and picture of the Mathis car see page 214 of the news section in this week's *Automotive Industries*.)

Officials close to Mr. Durant are expected to return to Lansing early next week and at that time they will augment the brief announcement of their chief.

Studebaker Profits Drop

SOUTH BEND, Aug. 4—Net profits of the Studebaker Corp. for the second quarter, after taxes, were \$1,075,180.17 and for the first half of the year \$2,567,317.09, as compared with \$6,150,289.51 for the second quarter, and \$11,183,878.76 for the second half last year. After deducting dividends on Studebaker and Pierce-Arrow preferred stocks and minority stockholders' interest in Pierce-Arrow Class "A" stock, the balance of net profits applicable to Studebaker common stock for the quarter were \$797,149.96.

Macauley Names Page and Graves

NEW YORK, Aug. 6—Alvan Macauley, president of the National Automobile Chamber of Commerce, has announced the appointment of R. P. Page, Jr., president of the Autocar Co., and Walter S. Graves, newly appointed sales director of the Dodge Brothers Truck Division, to the Motor Truck Committee of the Chamber.

July Output 275,278 Units

NEW YORK, Aug. 7—Production of cars and trucks in the United States and Canada for the month of July reached 275,298 units, according to an official estimate of the national Automobile Chamber of Commerce, based on shipment reports. The figure represents a decline of 47 per cent from July of 1929, and of 22 per cent from June of this year.

White Earns Requirements

NEW YORK, Aug. 6—Directors of the White Motor Co., Cleveland, in a meeting held here last week, reported net earnings of the company for the first six months ended June 30 of \$1,048,000, equal to \$1.31 a share on 800,000 shares of common stock, against \$1,404,000 for the same period of last year. The earnings are approximately \$250,000 in excess of the regular dividend requirements for the period.

The directors also declared a regular quarterly dividend of 50 cents a share, which was doubled from 25 cents late said, but results not yet tabulated.

Ford Resumes Production

DETROIT, Aug. 4—A hundred thousand men returned to work in the Rouge plant of the Ford Motor Co. at Dearborn today. In resuming operations, the Rouge plant began on a schedule of 8000 cars and trucks a day. For the present the shops will operate four days a week.

Taking of the inventory has been completed, officials of the company said, but the results have not yet been tabulated.

Federal-Mogul to Buy Watkins

DETROIT, Aug. 6—The acquisition by Federal-Mogul Corp. of the Watkins Mfg. Co. and all its subsidiary corporations has been approved by the stockholders of Federal-Mogul.

Produce 1684 Planes in Six Months Period

Final Estimate of Aero- nautics Branch Ad- vances This Figure

WASHINGTON, Aug. 6—Airplanes manufactured in the United States for civil use in the first six months of 1930 totaled 1325, according to a final estimate by the Aeronautics Branch of the Department of Commerce made public today.

The report is based on a record of Department of Commerce licenses and identification marks issued at the close of business on Aug. 1 to aircraft manufactured since Jan. 1, 1930.

The estimate of the Aeronautics Branch for 1929 airplane production is 6200 planes, of which 677 were military types. 1928 production was 4346, of which 847 were military. No figures are available for the half-year periods of these years.

In addition to the 1325 aircraft manufactured for civil use, 359 military aircraft were delivered to the Army and Navy during this six-month period, which places the total final estimate of production at 1684. Of the aircraft manufactured for civil use since the first of the year, 148 were exported.

Exclusive of the number of planes exported, there were 562 monoplanes and 598 biplanes manufactured during the period. Of the total number of monoplanes, 271 were open cockpit landplanes, with carrying capacities of one, two or three persons; 275 were cabin landplanes with carrying capacities for one to ten and over. Monoplane flying boats manufactured totaled five; planes convertible to land or seaplanes four, and amphibians seven.

Chrysler Shipments Hold Up

DETROIT, Aug. 5—Chrysler Motors Corp. has reported shipments to dealers of 21,779 automobiles in July compared with 27,211 for the same month last year. This is relatively the best showing made so far this year, being 80 per cent of last year's shipments of the same month, while total shipments for the first half of this year were only 65 per cent of the first half of 1929. Plymouth shipments were nearly twice those of July last year.

Men of the Industry and What They Are Doing

Brandt Visits West Coast

A. J. Brandt, president of the American Austin Car Company of Detroit, has just visited San Francisco in connection with a tour of the company's agencies throughout the country. He conferred here with Harry B. Morrill, general manager, and W. J. Cavanaugh, sales manager, of the Austin San Francisco Co., Ltd., local distributors. He said his company had not anticipated the landslide of public approval for the new bantam Austin which has overwhelmed dealers all over the country and expressed delight that 45,000 people had crowded the showrooms in the exhibition here. He said the concern's problem has become one not of selling but of building cars fast enough to make deliveries.

McBride Leaves Reo

C. J. McBride, secretary and treasurer of the Reo Motor Car Company of California, has resigned to become auditor for the Austin San Francisco Company, Ltd., newly organized automobile concern distributors of the Austin line. He has been with the local Reo company three years and has risen rapidly there. Previously he was with the Willys-Overland Pacific Company.

Hanshue Resigns From Fokker

Harris M. Hanshue has resigned as president of General Aviation Corp. and the Fokker Aircraft Corp. to devote his time to the transport division of Western Air Express.

Austin Appoints Prosser

J. C. Prosser has been appointed manager of the airport division of the Austin Co., engineers and builders, according to an announcement from the Chicago offices of that company.

Myers on Grant's Staff

R. L. Myers, zone manager of the Chevrolet Company for the Chicago area, has been called to Detroit and added to the special staff of R. H. Grant of General Motors.

Fisk Names Maynard

Charles E. Maynard has been appointed factory superintendent in charge of production at the Fisk Rubber Co., in Chicopee Falls, Mass.

Reo Appoints Kennady

Elijah G. Poxson, general sales manager of Reo Motor Car Co., has announced the appointment of Henry

Kennady as regional manager for Reo in the mid-western region. After nine years with Studebaker as manager of various domestic branches Mr. Kennady spent four years as Australian branch manager of that company. He later was assistant general manager of the Lalley-Light Corp. and re-entered the automobile business to take charge of the Kansas City office of Dodge Brothers. He was also a Dodge dealer in Memphis for five years.

Chevrolet Names Sneathen

Howard E. Sneathen has been appointed to the commercial car division



of the Chevrolet Motor Co., according to an announcement by Sidney Corbett, manager. Mr. Sneathen is well known in commercial car circles, having served for a number of years with Dodge Bros., latterly in the capacity of director of truck sales. Prior to his identity with the automotive industry he spent a number of years in the tractor field.

Oakland Names Hildebrand

T. F. Hildebrand has been appointed zone manager for the Oakland Motor Car Co. in the San Francisco zone. He comes here after acting as zone manager in another General Motors unit. He succeeds J. S. Newcomb, resigned.

N.A.A. Chapter Elects Manning

L. B. Manning, vice-president of the Cord Corp., was elected president of the Greater Chicago Chapter of the National Aeronautic Association at a meeting in the Hotel Sherman Thursday night.

Firestone Names Hageman

H. H. Hageman, five years with Firestone Tire & Rubber Co., has been appointed manager of the Northwestern branch, Minneapolis, Minn. For several months he has been acting manager.

Brother is Advanced

D. P. Brother, former assistant director of the sales and advertising section, General Motors Corp., has been appointed director of the advertising section, with offices in Detroit.

Tenney Visiting Coast

George C. Tenney, general sales director of the Marmon Motor Car Company, has left the Marman factory at Indianapolis for a short business trip to the Pacific coast. Mr. Tenney's trip is the first he has made into the Western territory since assuming the direction of Marmon sales activities and he will visit the company's distributors in Los Angeles, San Francisco, Portland and Seattle.

Ex-Cell-O Appoints Two

Ex-Cell-O Aircraft and Tool Corp. has announced the appointment of George B. Ashley, formerly with the Detroit Lubricator Co., to represent it in the Syracuse territory. William S. Gallagher has been assigned to the Buffalo region, according to the announcement.

Olds Promotes Preston

The appointment of R. P. Preston as service promotion supervisor of Olds Motor Works

is announced by C. R. Todd, general parts and service manager. Mr. Preston has been connected with the Oldsmobile-Viking parts and service department at the factory for several months.



Chamber Honors Three

Frederick J. Haynes, president, Durant Motors, Inc.; A. J. Brosseau, president, Mack Trucks, Inc., and Henry D. Sharpe, president, Brown & Sharpe Mfg. Co., have been appointed members of the committee on national defense of the Chamber of Commerce of the U.S.A., which will cooperate with the Army Ordnance Association in a demonstration of ordnance equipment at Aberdeen, Md., Oct. 9.

Reo Appoints de Liguori

Luigi de Liguori, Minneapolis, Minn., has been designated regional manager for the Reo Motor Car Co., and has opened an office at 802 National Building. The territory is the Northwestern States.

Anderson Joins Sterling

Carl G. Anderson has joined the Sterling Motor Truck Co., Milwaukee, in the capacity of regional sales director.

Steel Market Seen as Due for Upturn

Prices Have Reached Bottom Level for Period, is View

NEW YORK, Aug. 7—Unanimously the steel market voices the thought that this week marks the turning into the road of sustained, though probably slowly ascending activity. Resumption of shipments to parts makers and motor car manufacturers was accompanied by receipt of a moderate volume of fresh inquiries and specifications. Extreme temperatures in all of the steel-producing districts continued to affect output to some extent.

All in all, it looks now as though rolling mills would experience little difficulty in maintaining a fair rate of operations until after Labor Day when the first signs of fourth-quarter demand should begin to materialize. On the basis of the report issued by the leading interest's directorate on the occasion of the last meeting, a fair showing is looked for to be disclosed by the unfilled tonnage statement as of July 31, which will be made public on Saturday.

With the better feeling regarding prospects for business, the market's price structure is thought to have completed the process of liquidation. Black sheets, after having dipped to 2.45 cents, Pittsburgh, are now quite steady at that level. Full-finished automobile sheets are holding their own at 3.60 cents, Pittsburgh. The same holds true of strip-steel. Although nominally on a 2.10 cents, Pittsburgh, basis, cold-finished steel bars have been selling at concessions of \$1 @ \$2 a ton.

It is generally thought that prevailing prices represent the final dip which usually precedes improvement in demand. No one looks for so sudden a spurt in buying as to create the conditions that usually accompany a quick change from an exceedingly light to an intensively active demand when keen competition among mills for the first business brings a final dip after which prices begin to move upward.

Pig Iron—Inquiry from automotive foundries is on the uptrend. A 50c per ton price reduction in the Chicago district brought out a fair volume of business. Blast furnace sales agents predict that, with prices as attractive as they are, August will be a busy month for them.

Aluminum—The market is of a routine character. Prices are well maintained. The leading Swiss producer, part of whose output is marketed in the United States, plans extensive improvements of its plants.

Tin—The spot Straits market at the opening of the week stood at about 30 1/4c, denoting slight improvement. Selling pressure has lessened somewhat.

Lead—The leading interest revised its contract basing price upwards to 5.50c on Monday. This compares with 5.25c last Friday, denoting a rise of 5¢ per ton in the course of a week. While storage battery demand has not broadened materially, that from other consuming industries has. Moreover, Middle West lead production has fallen off sharply. A month ago lead sold at 5.15c, New York.

Zinc—The market has turned a shade easier.

Automotive Industries

Steel Founders to Meet

NEW YORK, Aug. 6—The next regular meeting of the Steel Founders Society of America, Inc., will be held at the William Penn Hotel, Pittsburgh, Pa., Wednesday and Thursday, Sept. 10 and 11.

The regular October meeting of the society will be held at the Pennsylvania Hotel, New York City, on Thursday, Oct. 23, the day preceding the New York meeting of the American Iron & Steel Institute.

To Present Engine Papers

PHILADELPHIA, Aug. 6—At the meeting of the British Association for the Advancement of Science which is to be held at Bristol, England, Sept. 3-10, a special session of the Engineering Section will be given over to papers and discussions on internal combustion engines. The following papers have been scheduled for this session: The Influence of Turbulence on the Highest Useful Compression Ratio, by T. F. Harley and R. Cook; Some Recent Progress in Air-Cooled Aero Engine Development, by C. F. Abell, and The Present Position of the High-Speed Heavy Oil Engine, by S. J. Davies and E. Giffen.

Offers Diesel Course

BROOKLYN, N. Y., Aug. 6—For the seventh consecutive year the Brooklyn Polytechnic Institute is offering an evening course in oil engine developments. The course will begin Sept. 30 and consist of 20 lectures, supplementary classroom discussion and laboratory periods. The lecturer will be Julius Kuttner, editor of *Diesel Power*. Classroom discussion periods will be handled by Prof. F. D. Carvin of the institute, and laboratory periods by Prof. J. W. Moore, also of the institute.

Dodge Test Ends First Month

DETROIT, Aug. 4—The Dodge eight mileage marathon car completed its first month on the road when it checked in at the Western Union office in Glendive, Mont., at 9 o'clock Thursday evening, July 31, with a total of 17,255 miles registered on the speedometer.

Bendix Sees Improvement

CHICAGO, Aug. 2—Vincent Bendix, president of the Bendix Aviation Corporation, has announced that releases on orders are much better for the next quarter, especially so those of August and September.

Ruxton Enters Canada

MONTREAL, Aug. 4—The Ruxton, front wheel drive motor car, made its formal public bow at the showrooms of Comfort Motor Sales, 3447 Park Avenue, Montreal, during the past week.

Automotive Building at Low Activity Level

Machine Tool Sales Feature Used Items

PHILADELPHIA, Aug. 7—New construction in the automotive field continued at low levels during the past week, showing little change in the volume as compared with the previous last week of July.

Machine tool sales were off, few inquiries having been reported by manufacturers of equipment. Automotive sales in this line were particularly light, small orders of used machines having led the list.

Among the announcements made this week were:

Chevrolet Motor Co., Detroit, filed plans for \$200,000 addition to Tarrytown, N. Y., assembly plant. Fred T. Ley & Co., New York, contractors.

Wing Aeronautical Corp., New York, has begun work on \$100,000 addition to plant at Newark, N. J., for manufacture of beryllium metal for dirigible and airplane use.

J. C. Van Vlandren, Paterson, N. J., architect, is planning \$100,000 repair and service garage to be built in Hawthorne, N. J.

Paterson, N. J., Board of Freeholders, planning \$100,000 expenditure for airport, including reconditioning shop, hangars, etc.

Brewer-Tichenor Corp., Cortland, N. Y., will build \$100,000 addition to manufacturing plant.

Republic Aircraft Corp., Chicago, plans to spend \$1,000,000 for manufacturing plant and airport facilities near Kankakee, Iowa. R. Levine & Co., architects.

C. H. Hill Motor Corp., Minneapolis, has awarded contract to Austin Co. for \$50,000 motor coach manufacturing plant at Oakland, Calif.

Mineola Airport Board, Mineola, Tex., planning municipal airport. Initial expenditure to be \$50,000.

Timken Roller Bearing Co., Canton, Ohio, plans \$65,000 addition to case-hardening plant.

H. G. Millott, Sandusky, Ohio, planning \$150,000 repair and service garage for Auxter Motor Co., Mansfield, Ohio.

Wilcox-Rich Corp., Saginaw, Mich., will build \$150,000 addition to manufacturing plant. Cowles & Mutcheller, architects.

Michigan Gear Co., Detroit, has placed contract with Austin Co., Cleveland, for \$75,000 addition to manufacturing plant.

Bendix Aviation Corp., South Bend, Ind., has begun work on \$100,000 addition to plant.

Lincoln Mfg. Co., Connersville, Ind. (automobile brakes, transmissions, etc.), will spend \$50,000 rebuilding part of plant destroyed recently by fire.

Motor Stocks Appreciate

NEW YORK, Aug. 5—Motor stocks listed on the New York Stock Exchange rose more sharply during the month of July than any of the other industrial groups listed, according to a compilation by Frazier Jelke & Co. Seven motors with an aggregate listed price of \$2,248,282,000 on June 30, 1930, had appreciated in value to \$2,624,482,000 by the end of July, a gain of 12.3 per cent.

The next largest increase in value was in the electrical manufacturing group, in which the 5 stocks listed gained 12 per cent in value. The increase in value of 100 industrial common stocks selected from the N. Y. S. E. list was 5.7 per cent for the period.

August 9, 1930

Black is Predominant as Automobile Color

Replaces Blue in Index For First Time

NEW YORK, Aug. 5—Black is at present the predominating automobile finish. "For the first time on record since the introduction of lacquer finishes, black has superseded all automobile color families," says the current issue of the *Automobile Color Index*, published by the Duco Color Advisory Service.

The black trend has advanced to its present peak largely because of decline in demand for blue, which held first position for a considerable period and topped all other color groups when the last index was issued. The fact is pointed to that while the black index position was but 32 in March, 1929, it now is 189, with blue standing at 158.

It is noted in the Index that "the predominant position of the blue color family has been interrupted but once since December, 1928." In January, 1930, the brown color group assumed the lead and retained its position through February.

Color preference has taken the following order: Black, blue, brown, green, maroon, grey. For the corresponding period of last year, the standings of the several colors were blue, brown, green, black, grey.

Motor Products Earn \$3.05

DETROIT, Aug. 4—Motor Products Corp. reports for the six months ended June 30, 1930, net profit of \$602,239, after depreciation and Federal taxes equivalent to \$3.05 a share on 197,366 no par shares of common stock. This compares with \$1,729,431 or \$8.55 a share on 195,457 common shares in the first half of 1929 after dividend requirements on preferred stock then outstanding.

Net profit for the quarter ended June 30, amounted to \$370,220 after above charges equal to \$1.87 a share on 197,366 common shares, comparing with \$232,090 or \$1.17 a share on 197,366 common shares in preceding quarter and \$796,956 or \$3.98 a share on 195,457 common shares in June quarter of the previous year after dividend requirements on the preferred stock. The preferred stock was called for redemption on May 18, 1929.

Chevrolet Appoints Two

DETROIT, Aug. 5—Chevrolet Motor Co. has announced the appointment of John Jerpe, formerly sales promotion manager in the Fort Wayne, Ind., zone for several months, to the position of sales promotion manager of the Flint, Mich., zone.

William Power, formerly sales promotion manager at Flint, has been appointed regional sales promotion manager, with offices in Flint.

County Officials to Meet

WASHINGTON, Aug. 9—Super-highways and Federal road systems will yield the spotlight to the lowly but important secondary roads when county highways officials from California, Florida, Michigan and other states meet in St. Louis, Friday, Aug. 15, Statler Hotel, at the call of Stanley Abel, president of the County Highway Officials' Division, American Road Builders' Association. Mr. Abel is county supervisor, Kern County, Taft, Calif.

Moline to Expand Plant and Force

MOLINE, ILL., Aug. 6—W. C. McFarlane, president of the Minneapolis-Moline Power Implement Co., upon recent visit to the local plant, where a \$125,000 improvement program is nearing completion, announced that production will be steadily increased there as soon as the expansion projects are completed.

Mr. McFarlane was in conference with Abe Anderson recently appointed general superintendent to succeed Frank J. Hoenigmann, who resigned to accept a Chicago position. F. R. Brownlee, works manager in charge of the three factories of the corporation, accompanied Mr. McFarlane.

Three hundred men, now working on repairs and maintenance and small production, will be transferred to production entirely by the middle of the month and early in the fall it is expected the force will be increased to 500.

Timken Bearing Resumes

CLEVELAND, Aug. 7—Timken Roller Bearing Co. has resumed operations in its various plants after a two-weeks vacation period. Company is employing around 4200 men in all plants which are operating on same basis as has prevailed since October, namely, four days a week, in most divisions with five in a few departments. Average is a little better than four days a week.

Changes Convention Date

WASHINGTON, Aug. 6—Change for the meeting date of the annual convention of the National Association of Motor Bus Operators, from Sept. 17 and 18 to Sept. 25 and 26 has been announced by the association. The place of the meeting, Hotel Stevens, Chicago, has not been changed. A tentative outline of the program for the convention has been published by the association in its bulletin.

Allis Orders Exceed 1929

CHICAGO, Aug. 6—Unfilled orders of the Allis-Chalmers Mfg. Co. as of July 31 totaled \$16,674,000 against \$17,926,000 at the end of June and \$14,896,719 July 31 of last year.

Commercial Credit Earns Requirements

Operating Income Less Than Last Year's Figure

BALTIMORE, Aug. 7—The semi-annual report of Commercial Credit Co. and subsidiaries for the six months ending June 30, 1930, shows all dividends more than earned for the period.

Dividends on the first preferred, Class B and subsidiaries preferred stocks were earned 3.34 times. Dividends on the \$3 Class A convertible stock were earned 3.53 times, with \$1,141,256.69, or \$1.10 per share, applicable to the average common stock outstanding for the period.

The operating results are less favorable for the six months ended June 30, 1930, than for the corresponding six months of last year. Gross volume of receivables purchased during the six months was \$202,419,448.49, as compared with \$238,014,901.71 for the same period in 1929.

Ainsworth Gets Dividend

CHICAGO, Aug. 5—The directors of the Ainsworth Manufacturing Co. yesterday declared the regular quarterly dividend of 62½ cents a share on the common stock. The stock dividend of 1 per cent which has been paid in preceding quarters, was omitted.



Mrs. Charles Moomy

Vice-president of the Carlisle Tire & Rubber Co., Carlisle, Pa., who has returned from a European business trip. Mrs. Moomy is believed to be the only woman in the rubber industry holding an important executive position

Pickwick Opens Largest Terminal

Kansas City Project Combines Hotel and Bus Facilities

KANSAS CITY, Aug. 6—The world's largest bus terminal enterprise was formally opened here Aug. 1 with the dedication of the new Pickwick-Greyhound Union Bus Depot and Terminal. The cost of the project was more than \$5,000,000.

The terminal has been under construction for more than a year and embraces more than a square city block (from Ninth to Tenth) on McGee Street. Included in the project is the bus depot proper; a mammoth garage; a 11-story hotel, the largest in Kansas City and also an office building. The hotel has 500 rooms, each with a bath. It is operated as the Pickwick Hotel.

The Pickwick-Greyhound headquarters are to be moved to Kansas City. The company operates more than 35,000 miles of bus lines in the United States. Charles F. Wren of Los Angeles is president of the company. H. H. Morgan is the vice-president and general manager and is in charge here.

The plan of the terminal permits the buses using the terminal to drive into an arena for the receiving and discharge of passengers. The waiting rooms and depot facilities are connected with the hotel so that a person can virtually step from a hotel room to the bus. The Pickwick-Greyhound lines has taken delivery here the last few days of approximately \$1,000,000 in new equipment.

G.M. Declares Dividend

NEW YORK, Aug. 7—At the regular meeting of General Motors directors held here today the regular quarterly dividend of 75 cents a share on the outstanding common stock was declared payable Sept. 12 to stockholders of record Aug. 16. The regular dividend of \$1.25 on the \$5 preferred stock was also declared, payable Nov. 1 to stockholders of record Oct. 6.

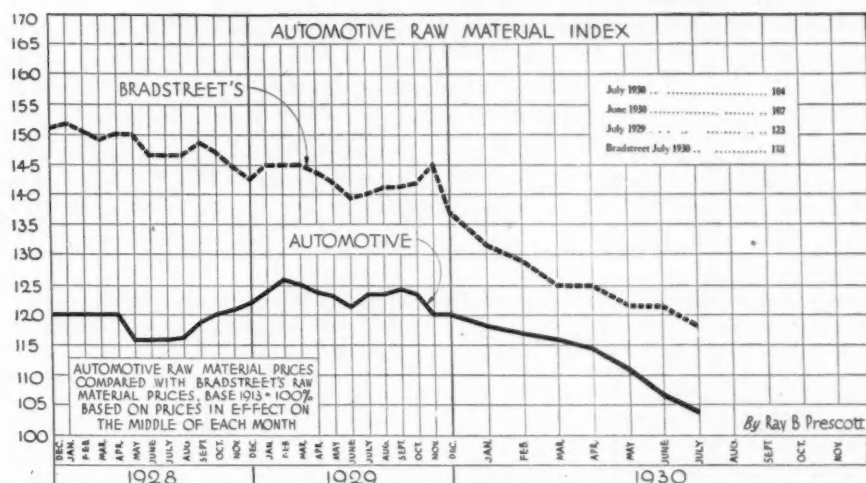
Iowa Tax Receipts Gain

DES MOINES, Aug. 6—July gasoline tax collections totaled \$1,048,723.30, the second time this year the revenue from this source has passed the million mark. The July collection was nearly \$150,000 over the June receipts of \$901,255.51 and brought the seven months' collections to \$6,189,649.81 as compared with \$4,804,249.36 for the same period in 1929.

Granville to Make New Planes

SPRINGFIELD, MASS., Aug. 6—Granville Bros. Aircraft, Inc., will manufacture several planes of the type flown by Lowell Bayles in the All-American Derby, winning second prize, and also plans a faster plane, capable of 180 miles an hour, and using a Chevrolet Motor, according to Zantford Granville, president.

Raw Material Prices Drop Again



Wayne Co. Sales Off 43 Per Cent

DETROIT, Aug. 6—New passenger car registrations in Wayne County during July totaled 5926, a decrease of 1502, or about 20 per cent from the total of 7428 in June, and a decrease of 4521, or more than 43 per cent from the total of 10,447 in July, 1929. Total registrations to date are 50,048, as compared with 88,134 for the same period last year.

Ford passenger car registrations last month totaled 4159, or about 70 per cent of the total of all makes in the county. Chevrolet showed total of 527, while Plymouth ranked third with 125 and Essex fourth with 109.

Commercial vehicle registrations for the county last month totaled 409, as compared with 484 in June and with 872 in July, 1929. Ford was first on the list with 282 and Chevrolet ranked second with 55. Total commercial vehicles registered to date was 3607, as compared with 6720 for the same period last year.

Reo Appoints Dodge

DETROIT, Aug. 4—Elijah G. Poxson, general sales manager of the Reo Motor Car Co., has announced the appointment of Jere E. Dodge as regional manager for the South Atlantic region.

Mr. Dodge joined the Reo sales forces in 1927, when he became district representative and later branch manager at Atlanta, which position he leaves to become regional manager. From 1921 to 1927 he was vice-president of Reo's Memphis distributing firm. This distributorship formerly had handled Hupmobile, Jordan and General Motors Truck.

Bellanca Has New Plane

WILMINGTON, DEL., Aug. 7—The Bellanca Aircraft Corp., New Castle, announces that it has been developing

a new transport airplane, in the hope of reducing the cost of operation of passenger transport lines. The plane, using a single engine, is expected to be comparable in performance to a tri-engined type.

Satisfactory completion of preliminary tests, after six months of development work, puts the company in a position to produce the plane commercially, according to the announcement. Details of construction are withheld until next week.

Mack 2nd Quarter Better

NEW YORK, Aug. 5—Mack Trucks, Inc., reports for quarter ended June 30, 1930, net profit of \$1,409,924 after depreciation, estimated Federal taxes, etc., equivalent to \$1.85 a share on 763,320 no par shares of common stock. This compares with \$490,709, or 64 cents a share, on 763,320 shares in preceding quarter and \$2,481,541, or \$3.28 a share, on 755,625 shares in June quarter of 1929.

Net profit for six months ended June 30 amounted to \$1,900,633 after above charges, equal to \$2.49 a share on 763,320 shares against \$3,911,128, or \$5.17 a share, on 755,625 shares in first half of previous year.

Milatz and Mitterwallner Sail

Otto Milatz, director of the Dornier Metallbau (airplanes), Friedrichshafen, Germany, and Paul Hellmuth Mitterwallner, also of the Dornier organization, sailed from New York, Wednesday, Aug. 6, on the S.S. Deutschland.

S.F.S.A. Appoints Bartholomew

H. S. Bartholomew, production and cost engineer, has been appointed directing head in a consulting capacity of the newly created cost engineering department of the Steel Founders Society of America.

Counties Improve 45,481 Miles of Highway Exclusive of State Roads, Report Shows

WASHINGTON, Aug. 9—A total of 45,481 miles of local and county roads, exclusive of state highways, were improved in 1929 by the counties of the 48 states, it is indicated by reports obtained from authorities of selected counties by the Bureau of Public Roads, U. S. Department of Agriculture. These reports indicate a total of 2,710,097 miles of highway in the county road systems.

The reports indicate that all counties spent a total of \$807,714,604 in the year for county and local road and bridge construction, including payments on bonds and transfers to state highway departments. It is estimated that available funds amounted to \$953,529,592. An unexpended balance of \$145,814,988 was on hand at the end of the year.

Of the total mileage improved in the year, the reports indicate 29,804 miles, or 66 per cent, were surfaced, and 15,677 miles, or 34 per cent, were graded and drained earth roads. The surfaced mileage includes 2905 miles of sand-clay and topsoil roads; 19,753 miles of gravel; 3666 miles of water-bound macadam; 2037 miles of bituminous macadam; 54 miles of sheet asphalt; 176 miles of bituminous concrete; 1191 miles of Portland cement concrete, and 22 miles of brick and other block pavements.

The estimated total mileage in the country road systems includes 454,111 miles of surfaced highways, including 416,770 miles of low-type and 37,341 miles of high-type surfacings. The low-type surfacings include 75,547 miles of sand-clay and topsoil;

292,463 miles of gravel, and 48,760 miles of water-bound macadam. The high-type surfacings include 16,692 miles of bituminous macadam; 1539 miles of sheet asphalt; 4057 miles of bituminous concrete; 13,254 miles of Portland cement concrete, and 1799 miles of brick and other block pavements.

The reports from the selected counties indicate that all the counties of the states spent \$256,581,811 for construction; \$260,477,801 for maintenance, and \$49,455,959 for miscellaneous items; that they paid out \$78,277,070 for interest on outstanding bonds and notes, and \$106,032,780 in retirement of the principal on the bonds and notes, and transferred \$56,889,183 to the states for work on state roads. The total disbursement is estimated to have been \$807,714,604.

The reports from the selected counties had an estimated total of \$953,529,592 in available funds, consisting of an unexpended balance of \$163,401,207 carried over from the previous year, and a total income of \$790,128,385. To the total income, the motor vehicle license fees and gasoline tax receipts allotted to the counties, \$51,886,324 and \$70,492,878 respectively, contributed 15 per cent; receipts from local bond sales, amounting to \$110,635,146, supplied 14 per cent, and the total road tax of \$414,152,567 contributed 52 per cent.

Appropriations from county general funds for the use in road work amounted to \$75,018,526; transfer of funds from state to counties for local road work amounted to \$31,714,578.

Perfect Circle in Good Position

CHICAGO, Aug. 4—The balance sheet of the Perfect Circle Company as of June 30, 1930, discloses a strong financial position. Current assets, including cash of \$314,932 and United States Government securities of \$229,757, total \$1,679,584, as compared with current liabilities of \$232,108, a ratio of approximately 7 to 1. The balance sheet gives effect to the semi-annual inventory adjustments. The company has no funded debt or preferred stock, its entire capitalization being comprised by the 125,000 shares of common stock. Total assets at the end of June were carried at \$2,928,800.

Foote Bros. Business Steady

CHICAGO, Aug. 4—W. C. Davis, president of the Foote Bros. Gear & Machine Company, announced that business for the first six months this year was about on a par with the corresponding period of last year. Economies in operation which amount to

approximately \$20,000 a month in savings are in effect and will be reflected in earnings, he said.

Incorporate Implement Co.

CHICAGO, Aug. 4—An Illinois charter has been granted the American Agricultural Implement Company, 20 North Wacker drive, with a capitalization of \$300,000 preferred and 16,000 shares no par value. The company will conduct a general manufacturing and merchandising business. The incorporators are Charles S. Babcock, Sidney W. Worthy and Charles H. Chapman.

G. M. of Canada Resumes

OSHAWA, ONT., Aug. 4—Following a two weeks' shutdown for taking stock, the General Motors of Canada, Limited, plant has once more resumed activities and large numbers of men have recently gone back to work. It is expected that within the next few weeks the number will again be as large as before stock taking.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Aug. 6—The intense heat last week retarded all retail trade excepting that of light summer goods. Judged by data now available, industrial activity during July was below that in June, while commodity prices continued to fall.

COST OF LIVING

The cost of living in the United States in the first half of this year, according to the Department of Labor, declined approximately 2.8 per cent. The decrease varied from 0.6 per cent to 4.9 per cent in different cities.

CONSTRUCTION AWARDS

Construction contracts awarded during June in 37 Eastern states, according to the F. W. Dodge Corporation, amounted to \$600,573,400, as against \$545,891,000 a year ago. The increase is entirely the result of the larger amounts involved in the construction of public works.

CRUDE OIL OUTPUT

Average daily crude oil production in the United States for the week ended July 26 amounted to 2,488,700 barrels, as against 2,500,000 barrels for the preceding week and 2,896,650 barrels a year ago.

CAR LOADINGS

Railway freight loadings for the week ended Aug. 2 stood at 82.9, cars, which marks a decline of 151,712 cars below those in the corresponding week last year and a decline of 105,587 cars below those in the corresponding week in 1928.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Aug. 2 stood at 82.9 as against 83.3 the week before and 83.4 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended July 30 were 27 per cent below those a year ago.

STOCK MARKET

The stock market in the earlier part of last week exhibited considerable strength; but weakness developed as the week progressed, and some special issues declined heavily. A few groups of stocks offered strong resistance to any depressing influences. Trading was on a moderate scale. Some issues suffered heavy net losses for the week, while prices all around were somewhat lower.

BROKERS' LOANS

Brokers' loans in New York City for the week ended July 30 increased \$2,000,000, bringing the total up to \$3,228,000,000, as against \$5,960,000,000 a year ago.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended July 30 showed decreases of \$20,000,000 in holdings of bills bought in the open market and of \$16,000,000 in total reserves. Holdings of discounted bills increased \$6,000,000, while holdings of Government securities were unchanged. The reserve ratio on July 30 was 83.5 per cent, as against 83.2 per cent a week earlier and 82.0 per cent two weeks earlier.

Chevrolet Completes 2 Million

FLINT, MICH., Aug. 9—Chevrolet Motor Co. turned out its two millionth six-cylinder car Thursday, less than 20 full months after the introduction of this type.

General Motors Gains Net Working Capital

Balance Sheet Also Shows Increase in Liquid Assets

NEW YORK, Aug. 7—Net working capital of the General Motors Corp. as of June 30, 1930, was \$290,577,234 compared with \$251,287,782 for the preceding six months period, according to a letter from Alfred P. Sloan, Jr., president, to stockholders of the corporation. The letter accompanied the consolidated income account and condensed balance sheet of the corporation which were published today.

Cash, U. S. Government and other marketable securities held by the corporation on June 30 amounted to \$175,693,782, according to the statement. This compares with holdings of \$127,351,530 during the preceding six months and represents an increase of \$48,342,352 in six months.

The condensed balance sheet of the General Motors Corp. is herewith.

Automobile Defects Checked

ST. LOUIS, Aug. 4—Of 4655 automobiles subjected to tests for perfection of operation here by the Automobile Club of Missouri, only 596 were satisfactory in every respect. Nearly half had defective brakes and more than half had bad headlights. Improper wheel alignment, faulty steering mechanism, bad stoplights and noiseless horns were common faults.

Hudson Wins Australian Trial

DETROIT, Aug. 4—A Hudson car won the annual reliability, speed and touring tests conducted by the Royal Automobile Club of Australia, the Hudson Motor Car Company was notified this week.

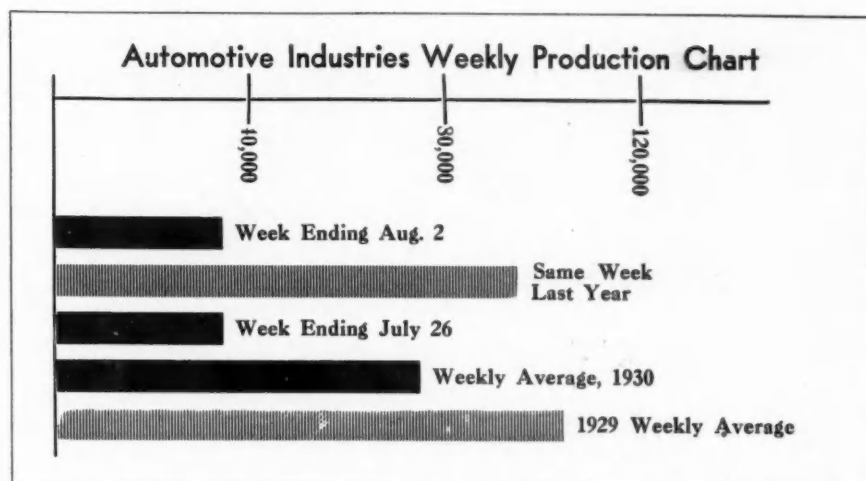
The tests were held over the Mudgee and Jenolan roads near Sydney, New South Wales, and attracted the biggest fields in the history of the event.

M. & E. A. Issues Contracts

CHICAGO, Aug. 4—Contracts for exhibition space in the Motor and Equipment Association's 14th Annual International Trade Exhibition, to be held in Cleveland, Nov. 10 to 14 inclusive, have been issued to all manufacturer members of the association, according to M. C. DeWitt, chairman of the show committee.

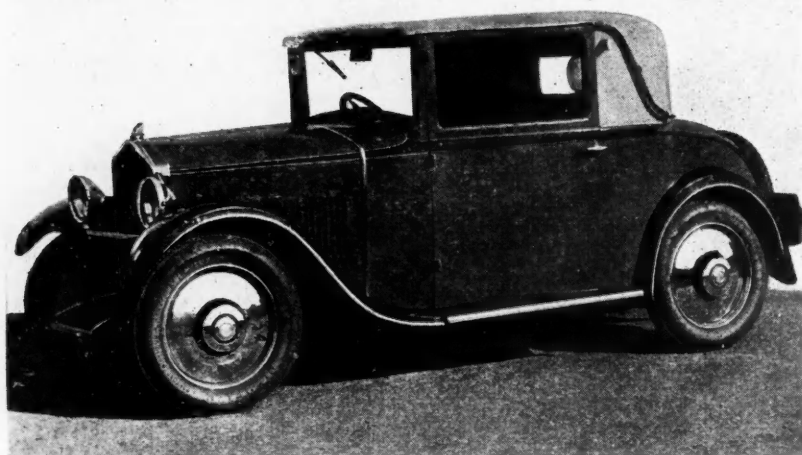
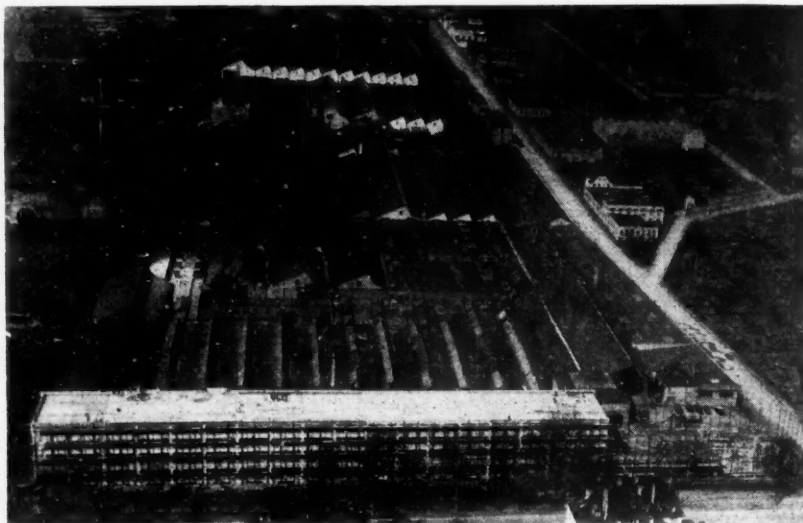
Stinson Adds Six Dealers

WAYNE, MICH., Aug. 4—Six dealers have been added by the Stinson-California Company of Burbank, California, within the last 30 days, William A. Mara, vice-president of the Stinson Corporation, announces. This brings the total number of Stinson dealers on the West coast to 13.



General Motors Condensed Balance Sheet

Assets		June 30, 1930	Dec. 31, 1929
Current Assets:			
Cash		\$131,048,483	\$101,085,813
United States Government securities		31,429,791	26,265,717
Other marketable securities		13,215,508
General Motors Management Corporation Serial 6% Gold Debenture Bonds due March 15, 1931		7,000,000
Sight drafts with bills of lading attached, and C. O. D. items		10,323,260	13,579,613
Notes receivable		2,183,695	1,977,363
Accounts receivable and trade acceptances (less reserve for doubtful accounts: in 1930, \$1,813,732; in 1929, \$1,549,336)		39,572,735	33,866,865
Inventories		159,772,602	188,472,999
Prepaid expenses		2,369,410	3,712,575
Total Current Assets		\$396,915,484	\$368,960,945
Investments:			
Investments in subsidiary and affiliated companies not consolidated		\$213,061,359	\$207,270,443
General Motors Management Corporation Serial 6% Gold Debenture Bonds		43,000,000
General Motors Corporation capital stocks held in treasury for corporate purposes (in 1930, 139,731 shares common; 7,550 shares 7% preferred; 100 shares 6% debenture)		7,073,347	69,929,476
Total Investments		\$263,134,706	\$277,199,919
Fixed Assets:			
Real estate, plants and equipment		\$616,605,819	\$609,880,375
Deferred expenses		18,336,230	18,168,099
Goodwill, patents, etc.		53,271,638	50,680,426
Total Fixed Assets		\$688,213,687	\$678,728,900
TOTAL ASSETS		\$1,348,263,877	\$1,324,889,764
Liabilities, Reserves and Capital			
Current Liabilities:			
Accounts payable		\$32,255,505	\$42,894,667
Taxes, payrolls and sundry accrued items		28,492,142	22,401,424
United States and foreign income taxes		28,067,641	28,701,486
Employees savings funds, payable within one year		7,814,380	9,010,571
Contractual liability to General Motors Management Corporation due March 10, 1931		8,106,000
Accrued dividends on preferred and debenture capital stocks		1,602,582	1,615,015
Extra dividend on common capital stock, payable January 3, 1930		13,050,000
Total Current Liabilities		\$106,338,250	\$117,673,163
Reserves:			
Depreciation of real estate, plants and equipment		\$207,043,412	\$194,094,963
Employees investment fund		5,094,840	9,915,825
Employees savings funds, payable subsequent to one year		35,628,473	32,412,619
Employees bonus		12,539,544
Sundry contingencies		4,423,328	3,333,577
Total Reserves		\$252,190,053	\$252,296,528
Capital Stock and Surplus:			
Capital stock of General Motors Corporation:			
Seven per cent preferred (authorized, \$500,000,000)		\$109,538,300	\$135,513,800
Six per cent preferred (authorized and outstanding)		1,289,900	1,410,500
Six per cent debenture (authorized and outstanding)		1,784,600	1,991,700
Preferred, no par value (authorized, 6,000,000 shares):			
\$5 Series (authorized, 1,875,366 shares; issued, 354,568.25 shares)		26,303,200
Common, \$10 par value (authorized, 75,000,000 shares; issued, 43,500,000 shares)		435,000,000	435,000,000
Total Capital Stock		\$573,916,000	\$573,916,000
Interest of minority stockholders in subsidiary companies with respect to capital and surplus		443,800	443,800
Surplus		415,375,774	380,560,273
Total Capital Stock and Surplus		\$989,735,574	\$954,920,073
TOTAL LIABILITIES, RESERVES AND CAPITAL		\$1,348,263,877	\$1,324,889,764



Mathis Plant, Newest Product

E. E. C. Mathis, president of the Mathis Automobile Co., Strasbourg and Paris, is bringing this four-cylinder 30 b.h.p. car (shown in the bottom picture) with him to the United States. The upper picture shows additions to the Strasbourg plant of his company + + + + +

Expects Tariff Benefit

OSHAWA, ONT., Aug. 4—Commenting on the announcement of the increase in the Spanish tariff against United States automobiles, H. A. Brown, vice-president and general manager of the General Motors of Canada, Limited, stated that he expected this increase to bring certain benefits to the Oshawa plant of the company. For about a year, the Spanish export trade of the General Motors Corp. has all been supplied from the Oshawa factory, and the new Spanish tariffs will give Canadian made cars a decided advantage.

Louisville Ford Opens Aug. 11

LOUISVILLE, Aug. 4—Although it had been generally understood that the Ford assembling plant at Louisville would resume on Aug. 4, and press stories had indicated that such would be the case, the reports were

in error, and the resumption was held up until Aug. 11, this opening date being confirmed by officials at the local branch.

Ford Plans Truck Exhibit

DETROIT, Aug. 4—A large permanent display of more than 100 Ford trucks and commercial vehicles with a wide variety of bodies and trailers and with several standard models of Ford chassis was opened by the Ford Motor Co. today in the Woodward Ave. building formerly used as the powerhouse of the company's Highland Park plant.

There will be Model A cars with pickups and de luxe delivery bodies, Model AA trucks with the four speed transmission and with both 131½ and 157 in. wheelbase. Trucks with open cabs, trucks with closed cabs, trucks with four wheels, trucks with dual rear wheels and a varied assortment trailers and semi-trailers.

Mathis on Visit Brings New Car

French Manufacturer in U. S. For Second Time in Year

PARIS, July 23 (by mail)—Sailing for the United States for the second time this year, E. E. C. Mathis, president of the Mathis Automobile Company, of Strasbourg and Paris, is bringing with him two samples of a new type light car about to be put on the French market. It is understood that American manufacturers have shown interest in the details of this car and the intention is to demonstrate it before American engineers with a view to its production in the United States.

Selling in France between \$800 and \$850, the new model is a four-cylinder with a French rating of 6 hp., but developing 30 hp. on the brake. The weight per brake horsepower is less than 55 lb., which is less than that of the most luxurious European big cars, and thereby gives the machine wonderful acceleration and good hill climbing ability, with a maximum speed on the level of 63 miles per hour. This model will be produced as a two-passenger coupe, and as a 4-5 passenger sedan luxury model, with a front seat 46 inches wide.

The Mathis factory at Strasbourg now stands fourth in importance in France, the increased output compared with 1926 being 110 per cent for 1927, 152 per cent for 1928, 174 per cent for 1929, and an estimate of 266 per cent for the present year.

Mr. Mathis will visit New York and Detroit, sailing for home on Aug. 16.

Ryan Plant Closed

ST. LOUIS, Aug. 4—The plant of the Ryan Aircraft Corp., at Lambert-St. Louis Field, has been closed. General business depression is responsible for the closing of the plant, which has been operating on a reduced production program since last fall. A service manager and several mechanics have been retained to make repairs on Ryan planes now in use.

The decision to stop production here of the famous Ryan monoplane was made last week during a visit by James Work, general manager of the Detroit Aircraft Corp., which controls the Ryan company. Plans for the resumption of manufacturing operations will be determined by directors of the Detroit corporation later.

Fair Includes Car Show

CHICAGO, Aug. 4—New models of many cars and myriad accessories will be on display at the Central States Fair, to be held Aug. 29 to Sept. 6 at Aurora, Ill. Forty-five airplanes will be provided to take up passengers.

Court Order Affects Former Moon Officers

New Group Upheld
in Operating Plant

ST. LOUIS, Aug. 4—An order restraining former officers of the Moon Motor Car Co. from interfering with the operation of the concern was issued by Circuit Judge Percy here last week. The injunction applies to Carl W. Burst, former president; W. D. Hemenway, Stanley Moon and H. W. Klemme.

The former officers barricaded the office and employed armed guards last April after new officers were elected at a special stockholders meeting, the legality of which the old officers declined to recognize. The new officers, W. J. Muller, Helm Walker, J. E. Roberts, Frederick Welch, and R. P. Kolwitz, gained possession of the plant under a temporary court order. It was announced in court yesterday that the new group has obtained 239,400 of the 350,000 shares of stock of the company.

Planters Approve Resolution

NEW YORK, Aug. 4—According to a cable dispatch from Singapore to the Rubber Exchange of New York, Chinese rubber estate owners and merchants at Jahore have approved the resolution of July 20, adopted by the Asiatic Planters Association.

Asiatic Planters resolved to recommend to the government of Malaya legislation for restriction by periodical stoppage of tapping or the re-introduction of the Stevenson plan in a modified form, provided similar legislation was enforced by the Dutch East Indies and Ceylon.

Louisville Sales Slump

LOUISVILLE, KY., Aug. 4—July new car sales in Louisville were 571 cars, as against 1038 for July last year; a slump of 44.9 per cent for July; and increasing the decrease for the year to 33.3 per cent, on 4610 cars sold, as against 6916 cars sold for the first seven months of last year. These figures and percentages were released yesterday by J. Garland Lea, secretary of the Louisville Automobile Dealers Association.

Illinois Sales Improve

CHICAGO, Aug. 4—July new car sales for Illinois show an improvement according to figures from the research department of the Illinois Chamber of Commerce, placing sales at 16,883, an increase of 544 cars over June and a decrease of 12,930 new cars as compared with the same period in 1929. Total car sales for the first seven months of 1930 were 125,856 as compared with 167,192 for the corresponding period of 1929.



For Length of Service

Harold Vance, vice-president in charge of manufacturing of the Studebaker Corp., and Harvey Dalton, controller, are shown receiving service medals from the hand of A. R. Erskine, president of the corporation. Mr. Vance's service with the corporation extends back 22 years and Mr. Dalton's for 20

To Dedicate Aero Beacon

CHICAGO, Aug. 4—Prominent figures in the automotive and aviation fields will join civic leaders at the dedication of the Lindbergh beacon light, Aug. 27. The light, donated to the city by the late Elmer Sperry, will be mounted on the Palmolive Building. Among those who will serve on Mayor Thompson's committee are: John Hertz, Eugene McDonald, Charles Walgreen, Jack Mitchell, Vincent Bendix, Reed Landis, George Foster, Albert Dickinsen, D. L. Cord, Maj. Gen. Frank Parker, Britton I. Budd, Charles S. Pearce, Philip Kemp and William Grunow.

Graham-Paige Body Resumes

EVANSVILLE, IND., Aug. 4—The Graham-Paige Body Corp., division of Graham-Paige Motor Corp., here, resumed production Aug. 4 after a

two weeks' vacation period for employees. The factory will go into production with 600 employees, and average 100 bodies a day, according to J. W. Evans, factory manager.

United Reports Profit

NEW YORK, Aug. 4—United Aircraft and Transport Co. reports a net income for the first six months of the year of \$2,102,531, after all charges and minority interest and Federal taxes, equal to 86 cents a share on 2,022,139 shares of common stock. This compares with a net profit of \$4,410,046 or \$2.55 a share on 1,594,619 common shares in the same period of last year.

AC Has New Plug Chart

DETROIT, Aug. 4—A new spark plug chart is being distributed to the trade by AC Spark Plug Co.

A.S.M.E. Announces Chicago Aero Program

Meeting to Be Held During
National Air Races

CHICAGO, Aug. 4—C. B. Cole, chairman of the Chicago section of the American Society of Mechanical Engineers, has prepared the program for the annual meeting of the society which is to be held in Chicago during the National Air Races, Aug. 23 to Sept. 1.

More than 1500 members have signified their intention to be present. A number of papers on engineering problems relative to aviation will be presented at the sessions. Technical experts from all over the United States and several from Canada and Europe are on the program.

Among the speakers will be Gilbert C. Budwig of the aeronautics branch of the Department of Commerce. R. C. Alden, assistant director of research for the Phillips Petroleum Co., will speak on gasoline, and James R. Fitzpatrick, vice-president of the Haskelite Manufacturing Co., has been invited to read a paper. Paul E. Hovgard, airplane pilot and at present engineer for the Keystone Aircraft Corp. of Bristol, Pa., and Robert R. Osborn, designer for the Curtiss Airplane & Motor Co. and builder of the Curtiss Tanagar plane that won the last Guggenheim safety contest, are others on the list of speakers. Aviation Post 651 of the American Legion, the Chicago Engineers' Club and the Western Society of Engineers are co-operating.

Franklin Plans Custom Exhibit

SYRACUSE, Aug. 4—Arrangements have been completed by the Franklin Automobile Co. for a special showing of Franklin air-cooled custom cars during the August race meet at Saratoga, N. Y. The Franklin exhibit will be held in the Crystal Ball Room of the Grand Union Hotel. The exhibit will be under the supervision of M. K. Ledyard, manager of Franklin's custom body department.

Martin Seeks Canadian Site

MONTREAL, Aug. 4—James V. Martin, designer of the Martin light car, experimental models of which have been manufactured in a plant at Garden City, N. Y., is seeking a site for a plant in Canada. Manufacture for the Canadian market and for export is contemplated.

Reynolds Sells Division

JACKSON, MICH., Aug. 4—Effective Aug. 1, 1930, the Reynolite Division of the Reynolds Spring Co., Jackson, Mich., became the wholly owned subsidiary of Cutler-Hammer, Inc.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

New York, International Import Trade Exposition Aug. 4-9
Lwow, Poland, Sample Fair September
London, England, Olympia Show October
Berlin, International Automobile Nov. 6-16

CONVENTIONS

Society of Automotive Engineers, Aeronautical, Chicago Aug. 26-28
Fifth International Air Congress, Auspices Royal Aero Club, The Hague, Holland Sept. 1-6
Eastern States Exposition, Springfield, Mass. Sept. 14-20
National Safety Council, Annual Safety Congress, Pittsburgh Sept. 29-Oct. 4
Sixth International Road Congress, Washington, D. C. Oct. 6-11
Exhibition—American Roadbuilders Association, Washington, D. C. Oct. 6-11
Society of Automotive Engineers, Production, Book-Cadillac Hotel, Detroit Oct. 7-8
Society of Automotive Engineers, Transportation, Pittsburgh Oct. 22-24
Motor and Equipment Association, Convention, Cleveland Nov. 10-14
N. S. P. A. Convention, Cleveland, Ohio, Nov. 17-21
First International Aerial Safety Congress, Paris, France Dec. 10-23

SALONS

Chicago, Drake Hotel Nov. 8-15
New York, Commodore Hotel Nov. 30-Dec. 6
Paris, France Oct. 2-12
Prague, Czechoslovakia October
Paris, France, Salon (Commercial Vehicles) Nov. 13-23
Brussels, Belgium, Salon Dec. 6-17

RACES

Italy (Grand Prix) Sept. 7
France (Grand Prix) Sept. 21

Implement Makers Merge

CHICAGO, Aug. 4—Announcement of the merger of five companies into a \$4,000,000 corporation to be known as Farm Tools, Inc., was announced yesterday. The firms included in the combine include: Vulcan Plow Co., Roderick Lean Co., Mansfield, Ohio; Roderick Lean Co. of Indiana, Hayes Pump & Planter Co. and Peoria Drill & Seeder Co.

Kinner Ships 202 Engines

GLENDALE, CALIF., Aug. 4—Robert Porter, president of the Kinner Airplane & Motor Corp., reports shipments of 202 engines during the first seven months of 1930. This compares with shipments of 408 motors during the first seven months of 1929.

The company has unfilled orders on hand of approximately 700 engines as compared with unfilled orders a year ago of approximately 900 engines. The company is now producing two engines a day.

Franklin Ties in Tour de France

SYRACUSE, Aug. 4—A Franklin Model 147 sedan tied for first place in the Tour de France, according to information received by the Franklin Automobile Co. The Franklin entry completed the course without penalties in the meet which judges cars on endurance, regularity, speed, starting and braking ability, according to the announcement.

Construction Begun on New Ford Plant

Richmond, Calif., Unit Will
Employ 2400 Workers

RICHMOND, CALIF., Aug. 5—Ground has been broken here for and work begun on the proposed \$5,000,000 Ford assembling plant. The plant itself will involve a cost of \$3,500,000 without equipment.

The plant is to have a capacity of 400 cars daily and will employ 2400 men in full operation. The parts for the cars will be delivered directly to this branch by Ford-owned steamers, which will tie up at the 500-foot dock on the Richmond inner harbor which is part of the enterprise. Spur tracks from the Southern Pacific and Santa Fe railroads will run into the assembly building, which will be 950 feet long and 320 feet wide.

There will be a boiler house, 90 by 160 feet, and an oil house 113 by 63 feet, to be used for storing liquids used in manufacturing and assembling the cars. A craneway building, 400 by 100 feet, will parallel the dock and contain a depressed railway track.

Fairbanks Profit Drops

CHICAGO, Aug. 4—The six months' statement of earnings for Fairbanks, Morse & Company and subsidiaries, made public Thursday, shows net income for the period ended June 30 of \$803,461 as compared with \$1,121,826 for the first half of 1929, both figured after the usual charges and reserves for Federal taxes. The 1930 half-year profit is equivalent to \$1.52 a share on the 368,977 shares of common stock after deduction of dividends for the preferred issue, and compares with \$2.11 earned on the common for the first half of 1929 on the same capitalization.

Egypt to Order Vehicles

WASHINGTON, Aug. 4—A substantial volume of trucks, buses and motorcycles is to be purchased soon by the Egyptian Government, according to advices received in the Automotive Division, Department of Commerce. The Mechanical Transport Department of the Ministry of Communications has issued conditions of tender for the purchase of these vehicles, the appropriation for which, amounting to about \$160,000, was made available in April.

Engineering Firm Incorporated

CHICAGO, Aug. 4—Aeromotive Engineering Co., 130 North Wells Street, has been incorporated with a capitalization of \$20,000 to engage in a general manufacturing and merchandise business. B. C. Burton, A. D. Adler and N. R. Roberts are the incorporators.